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THE GORGE OF THE ARUN

Captain C. J. Morris, 3rd Q.A.O. Gurkha Rifles

Read at the Evening Meeting of the Society, 18 June 1923.

WHEN the monsoon put an end to our climbing activities on Mount Everest it was decided to go down to Kharta for a short rest before returning to India, and if the weather permitted to visit the Kama valley. On the morning of 10 June 1922 we looked on Mount Everest for the last time, and proceeding *viâ* Rebu and the Doya La reached Teng, at the entrance to the Kharta valley, on the 14th, after a quite uneventful journey. Major Norton and Captain Bruce had been awaiting us for some days, as they had come on before us in order to try and recuperate from the effects of their frostbite.

The Arun, one of the principal tributaries of the Kosi, rises behind the main chain. It drains the plains of Tingri and Khamba in Tibet, and then with the force of its accumulated waters carves its way through the main chain of the Himalaya directly between the gigantic mountain massifs of Everest on the one side and Kangchenjunga on the other. Between our camp at Teng and the village of Kyimateng, a distance of only 20 miles in a straight line, the river drops 4000 feet. We were particularly interested to explore this part of the Arun, and to find out whether this tremendous drop consisted of a series of great rapids and waterfalls, or of a steady fall in the bed of the river. Also it was quite apparent from our view of the river from Teng that the gorges would be of the very greatest interest. But it was doubtful whether we should be able to undertake this journey on account of transport difficulties and weather. In the mean time we made arrangements for the whole party to go over to the Kama valley.

Having dumped all our heavy kit we set off on our first march. It was a short one of only a few miles, for it was necessary to halt for the night at Kharta to pay our respects to the Dzongpen, who had done so much for the 1921 Expedition, and in whose district we were now travelling. Although the Kama is only two marches from here, and also forms part of the Kharta district, the Dzongpen told us that during the ten years in which he had held office he had found it quite impossible to visit the country thereabouts, as he had been told that it would be necessary for him to go a portion of the way on foot owing to the state of the roads,

and he considered this an indignity he did not feel justified in submitting to. I think this attitude is quite typical of the ruling classes in rural Tibet, and must in a great measure account for the slack way in which the country is governed in the less-frequented parts. In the evening the Dzongpen entertained us all to dinner, but not having been brought up to eat macaroni with a pair of slender chopsticks and to consume numerous cups of tea spiced with butter and rock salt, I cannot say that I thoroughly enjoyed the function. However, the ever-thoughtful Norton had tactfully arranged that the courses of the Dzongpen's dinner should be alternated with others of our own cook's manufacture, and this most skilful arrangement saved the majority of us from going hungry to bed.

On the following morning we were off early, as we had a long uphill march over the Samchung La. Looking back from the top of the pass one has a wonderful view right up the part of the Arun valley which lies in Tibet; but on the other side of the pass a still more wonderful sight was in store for us, for here the ground was covered with bright yellow primulas (Sikkimensis) and dwarf rhododendrons in full bloom. We could see nothing of the country in front of us, as a thick mist was drifting across from the Chog La and it now began to rain. As we reached the bottom of the pass the mists cleared a little, and we were able to catch a glimpse of the road we had just descended by. We pitched our camp on the banks of the beautiful lakes in the valley between the two passes, but it was not until early the following morning that we were able to realize the full beauty of the scenery surrounding us. I have never seen such wonderful colouring in water, ranging from deep purple to bright cobalt-blue.

Making another early start we were soon at the top of the Chog La, which still had a good deal of snow on it. We had hoped to get a view of Makalu from here, but after waiting over an hour we gave it up as hopeless, as the clouds were getting thicker all the time. After a long and rather tiring descent we reached our camping-ground at Sakyeteng in the Kama valley. We were now almost enveloped in the clouds, and remained practically so during the whole of our stay here. Photography was extremely difficult, as it often meant waiting for a considerable time in the hope that the clouds would lift for a few moments and allow one to take a picture. After a short rest here we had intended to split up into small parties—some visiting the Popti La and lower Kama, while others explored the upper part of the valley. But owing to the bad weather and the difficulty of obtaining any coolies locally it was decided that only Captain Noel and I should go down to Kyimateng, where the Kama flows into the Arun, and from there attempt to find a way through the gorge and return to Teng by that route. The remainder of the party were to return to Teng at once, and to make arrangements for the homeward journey across Tibet pending our arrival.

Sakyeteng itself is merely a small collection of grazing huts used by

Tibetan shepherds who bring their flocks to graze at this season of the year. I imagine that the huts are unoccupied during the greater part of the year, and the position of the camp probably changes from year to year according to whether there is good grazing in the vicinity or not. It would be interesting to visit Sakyeteng in say twenty years' time, and to see whether the place was still used. It would also be a matter of great interest to find out how these temporary villages are named, as I was unable to find any one who could tell me the meaning of Sakyeteng, which might have given one a clue.

Hearing that a party of Tibetans had come from Kyimateng with supplies of salt, we went over to interview them in the hope that they might be persuaded to carry our kit for us. They agreed to come as far as Kyimateng, and with the help of a few of our own Sherpa porters we were able to make a start. Looking from the shelf of Sakyeteng, on which we were camped, one sees 2000 feet below the white thread of the Kama torrent which issues from the glaciers of Mount Everest and Makalu. The steep hillside is clothed in dense green forest at this season of the year, and the steady drizzle of rain soaks the undergrowth and drips from every leaf. A fairly good path leads down the left bank of the river as far as Chutromo, where, crossing the river, it ascends to the Popti La, a more or less frequented trade route between Nepal and Tibet. Of course this was about the worst time of the whole year in which to travel, for we could not hope for more than a few occasional hours without rain. Nor is the rain the only thing to contend with, for in a densely vegetated country like the Kama the undergrowth swarms with hungry leeches, and it is almost an impossibility to escape from their attentions.

We set off from Sakyeteng on June 27, in heavy rain. We had hoped to reach Kyimateng, but after marching some three and a half hours we met Noel's servant, who had been sent forward to buy supplies, and was now on his way back to meet us. He told us that we were not even half-way to Kyimateng, so we decided to camp for the night at the first suitable spot. A short distance beyond we came to the bridge leading across to the Popti La, at one time a much-frequented trade route between Nepal and Tibet, but now more or less discarded in favour of the more direct route straight up the Arun valley. Near the bridge is a small clearing, known as Chutromo. There were a few deserted stone huts dotted about, but they appeared not to have been occupied for some considerable time. It was this fact that first caused me to think that these small grazing villages do not exist in the same place for more than a few years. It would also seem to prove that the Popti route has fallen into disuse.

The rain had now ceased, and we made haste to pitch our tent before it should start again. A little later a somewhat watery sun made its appearance. No sooner had the sun set than thousands of tiny midges emerged, making rest almost impossible. They continued their attentions far into the night, and at last, driven to desperation, we lit a small fire of

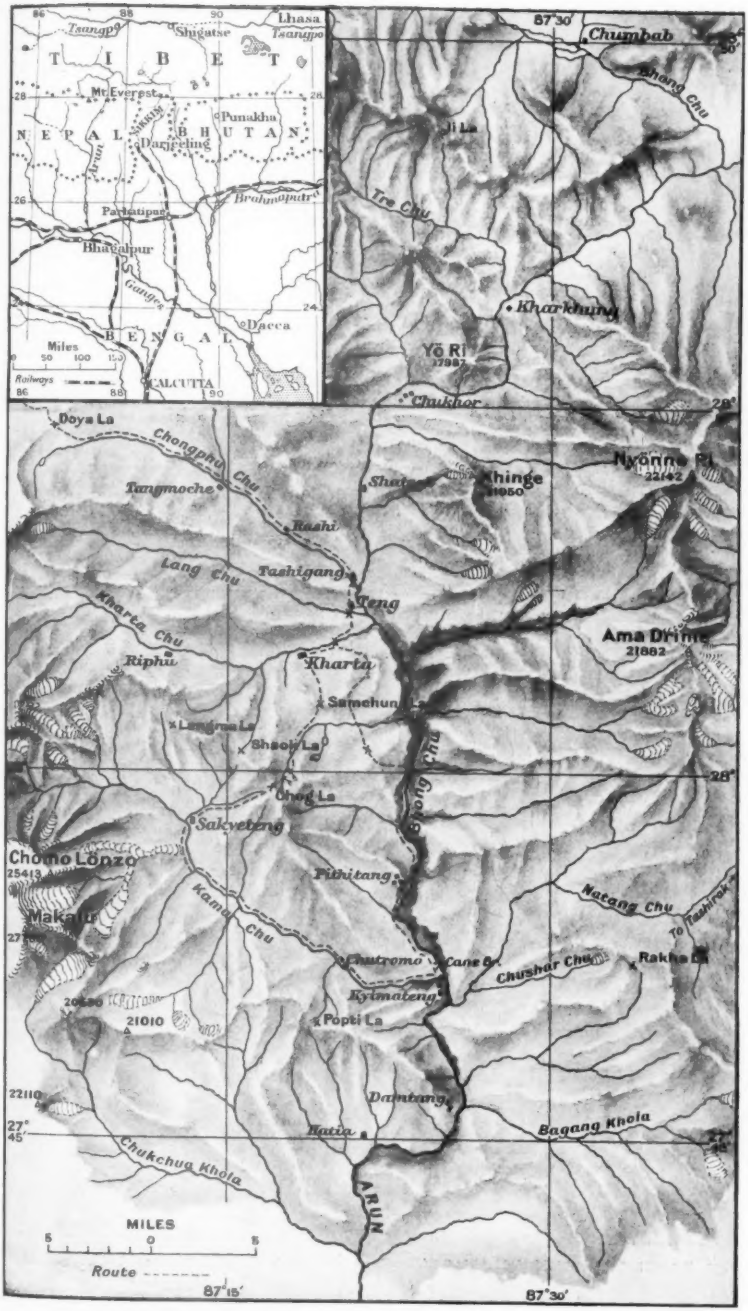
juniper twigs at the tent entrance, and took it in turns to sit up and keep it from going out.

There was no rain when we started the next morning, but thick clouds were drifting slowly up the valley. We were soon level with the Popti La. In spite of the humid atmosphere of the valley below there was still a little snow lying in the shadows on the Pass. The forest now became still more wonderful, and the trees were very much larger as we got lower down. Here and there by the bed of the river we came across delightful little glades, carpeted with moss and thick with purple irises. The path became almost invisible at times owing to the thickness of the undergrowth, and for about 2 miles was about 4 inches under water; but here the Tibetans had cut down large trees and laid them end to end along the path, which enabled one to keep fairly dry as long as one did not fall off, a not infrequent occurrence.

At last the forest ended abruptly and we were walking across grassy slopes, high above the river. Just before the end of our march we came across a party of Gurkhas, the first real Nepalese we had yet met. They had come up from Dhankuta, one of the largest villages in eastern Nepal and a few days' march down the Arun, to graze their flocks, and were halting here a few days before going on to the rich grass lands above the gorge. After a steep descent we crossed the river by a quaint little bridge, almost hidden by the overhanging trees, and commenced the short but steep climb up to the village of Kyimateng. We camped a little outside the village, which is perched on the high cliffs overlooking the junction of the Kama and Arun rivers. Looking up the Arun from our camp we could just see the tiny village of Tsanga, but the river here bends sharply to the left and is lost to view—while looking down the river we get a glimpse into the forbidden land of Nepal.

Kyimateng, though strictly speaking in Tibet, is a typical Nepalese village. The neat little houses are each surrounded by well-kept fields of Indian corn, wheat, and barley. The fields are bounded by stone walls, and each contains a small machan (light bamboo structure) from which a look-out is kept for bears at night. Kyimateng and the surrounding villages are so inaccessible that the people do not appear to come under the influence of either Tibet or Nepal, leading an independent life. The village boasts of five *Gömbos* (headmen), who all came to pay their respects early the following morning. They were extremely interested in our tents and cameras, and after a thorough inspection of everything we possessed, left in order to carry out their various duties in the village. They were unable to tell us anything of the route through the gorge, but promised to find out and also to try and get us another relay of coolies, for our original ones had not bargained to go beyond this place.

We spent the rest of the morning taking photographs in the village, and in the afternoon, as Noel was still busy with his kinema, I went to return the Gömbos' visit and to find out what our chances were of making



SKETCH-MAP OF THE GORGE OF THE ARUN (BHONG CHU)

NEPALESE AND TIBETANS FROM SAKYETENG

THE POPTI LA FROM THE NORTH BANK OF THE KAMA, 1¼ MILES BELOW CHÖTROMO

a start in the morning. To my horror I found practically the whole village drawn up outside the chief Gömbo's house. Bamboo matting had been laid down on the ground outside, and after an exchange of greetings we sat down to numerous cups of tea, fortunately without butter or salt this time. We conversed on general topics for a time, and then I thought it best to find out what arrangements had been made for us. The Gömbo at first said that there was no road through the gorge, and in any case no one was willing to go with us, as all the men in the village were occupied in the fields at this season of the year. I knew the information about there being no road to be incorrect, as the Gurkhas we met on the road the day before had told us they were on their way there. However, after a promise of double pay he guaranteed to find us coolies for the following morning.

It was necessary to pay the coolies in advance to the Gömbo, and in so doing I had an insight into the method of bookkeeping in force in this part of the world. A large board and a bag of beans were produced. The beans were laid out in rows, a row for each coolie, and a bean for each anna of the amount we agreed to pay each man. After counting the total several times the amount due from us was arrived at, and the board with the "account" on it was carefully removed inside the house. There are quite a number of Nepalese living in the village, and in consequence most of the inhabitants are bi-lingual, speaking Gurkhali, the *lingua franca* of Nepal, and Tibetan with equal fluency.

The Gömbo told me that the Popti route was being used less every year, and also that there was a fairly frequented path from Kyimateng to Tashirak, a Tibetan village some 30 miles away to the east, from which Captain Noel was turned back when he attempted to approach Mount Everest in 1913. In his paper ("A Journey to Tashirak in Southern Tibet, and the Eastern Approaches to Mount Everest," *Geogr. Journ.*, May 1919) Noel mentioned that "the approach to Mount Everest from the east would probably be across the Arun and directly west up the valleys leading to the foot of Everest." His route would undoubtedly have taken him the way we had just come, and it would have been a source of great satisfaction to him to have been able to go across to Tashirak again, and so complete his previous journey, but there was no time for this.

The road from Kyimateng, after recrossing the river and passing the fields of Lungto, which, although only a few hundred yards from Kyimateng across the river, is a purely Tibetan village and contains no Nepalese, plunges once more into the forest. The path mounts up over the cliffs, almost hiding the view of the river below, but revealing across the valley the magnificent waterfalls of Tsanga, some thousand feet in height. We continued through the forest for about three hours and then emerged on to a small alp, high above the river-bed. We found here a small matting hut, unoccupied but guarded by two savage dogs which were chained up inside. We decided to camp for the night. Strangely enough there was

no sign of water near, and we had to wait until the return of the occupants of the hut before we found out where they obtained it. Fortunately they soon returned, warned of the strangers' arrival by the savage barking of the two watch-dogs. They turned out to be Gurkhas—of the Rai tribe—and, like those we had previously met, also from Dhankuta. The old man, who must have been nearly eighty, had been, many years ago, in one of our Gurkha regiments, so we were soon talking of weapons and methods long since obsolete. He was able to tell us a certain amount about our route ahead, and said that this tract of country, although uninhabited by Tibetans, was yearly visited by large numbers of Gurkhas. The high cost of living would not appear to have penetrated as far as Nepal yet, for the old man was delighted to sell us a sheep and two chickens for the small sum of two rupees.

At the present time Nepal is an absolutely closed country, and is likely to remain always so. It is in some ways a great pity, for in this small kingdom is some of the most magnificent mountain scenery in the world, while the people certainly are amongst the most interesting. In this part of the Arun, though, it is possible to get quite a fair insight into the life of the high-living Nepalese. When one considers that they are out at day-break with their flocks and wandering about the hills until nightfall, it is no wonder that they are a hardy race. It is a common belief that all the inhabitants of Nepal, known generally as Gurkhas, are of one race. There are, as a matter of fact, at least eight distinct races, most of which speak a language totally different from the others, although all speak Khaskura, the *lingua franca* of the country.

The tribe inhabiting the north-east corner of Nepal, which adjoins the part of Tibet we are at present concerned with, differ from all the others. They are known as the Rai tribe. This tribe is again divided into a very great number of smaller tribes, and each of these sub-tribes again has a distinct language of its own. Many years ago, before Khaskura was known throughout the country, it must have been difficult for a Rai, particularly, to wander very far afield, for he would soon have been in a district where his speech was unintelligible. It would be interesting to trace the origin of all these languages. I presume that they probably have some connection with Tibetan.

In addition to the Nepalese there live, in this north-eastern corner, the Sherpas. The word Sherpa is Tibetan, and means "an easterner." They live on the highest slopes of all, speak Khaskura and Tibetan, and are extremely proud of being Nepalese subjects. They are the hardiest men of all, and provided us with the porters who did such magnificent work on Mount Everest, and without whose labours very little would have been accomplished.

Like all mountain people, the Nepalese are extremely fond of music. Their tunes are quite unlike the music of either India or Tibet; in fact, in some of the songs of eastern Nepal the scale employed is the

same as our own. They are either sung to the accompaniment of a mādal (a kind of small drum, played with the flat of the hand and the fingers) or on an instrument known as the bānsuli. This is merely a slender piece of hollow bambo with a series of little holes in it, with which the notes are formed. It gives a sound rather like a flute, but of course much thinner in tone. I will give you a few illustrations of the best-known tunes on the piano. But you must realize that it is difficult to give a true idea of Eastern music on this most Western of all instruments. You will notice in some of the tunes a striking resemblance to some of the old Scottish airs.

With regard to the words of the songs, it is not really possible to translate them into English. In most cases they are picturesque descriptions of the scenery, and give one a very good idea of the geography of the country and the customs of the people. The Arun figures in a very great number of them. We must now leave this to me most fascinating subject and continue our journey.

This part of the Arun, situated between Teng and Kyimateng, has no great waterfall, but passes through three deep gorges, one at Kyimateng, one at Teng, where, as we saw before, it enters the main range, and another between these two. For the rest it is a raging torrent running through narrow forested defiles. The remarkable drop of 4000 feet is caused by a steady fall in the bed of the river. In the centre of the gorge this fall is less pronounced and the river widens to nearly 80 yards. The average width of the river is from 30 to 40 yards, and the section of the valley is roughly V-shaped. In order to pass these gorges the path ascends and descends many thousands of feet. Looking down from the precipices one gets occasional glimpses of the torrent below, the cliffs above frequently rising to as much as 10,000 feet above the water and ending in snow-capped peaks. Here and there the promontories of the cliffs afford a wonderful panorama which rewards the exertions of the terrific ascents. But as these alternate ascents and descents are not single occurrences, but the normal nature of the track, one soon ceases to revel in the scenery and would willingly forgo these bird's-eye views from the cloud-level for the sake of a few yards' marching on the flat.

At the end of our second day's march the track appeared to come to an end. We could find no place suitable for camping, so we cut away the undergrowth from what did duty as the road. While we were doing this a swarm of bees descended on us, scattering the porters in all directions. They quickly wrapped their faces and hands in blankets, and it was some time before we could persuade them to uncover themselves. We spent the rest of the evening trying to discover the path, but were unsuccessful in finding anything. Noel and I both decided that we would not face the long and tiring journey back again the way we had come, so the only thing to be done was to make a road of our own. This we did by cutting a way through the thick jungle with kukris (a curved knife, the national weapon of the Nepalese). Fortunately the trees were mostly bamboos, so

that this was comparatively easy. We mounted over the great central gorge, and on the far side of it, dropping down to the river-bed, found a narrow strip of sand just big enough to contain our tiny camp.

This was one of the most beautiful spots seen in the valley. Wild flowers grew here in great profusion, the most conspicuous amongst them being a giant white lily, fully 6 feet high. That evening the rain, which had been falling for most of the day, cleared, and the rising clouds revealed the luxuriant walls of the valley, which seemed to rise almost vertical above us, with black caverns beneath, where the trees trailed and projected over the water's edge.

During the fourth march we struck the track again, which is here apparently used by the Tibetans, who come down from the Teng end of the valley in order to cut wood. This path led up a side valley descending from the mountains round about the Chog La. We camped at the head of this valley, and next day crossing the Sakai Chu, a small stream which descends from the Samchung La, and the Yulök La, descended to Kharta. Here we were able to get ponies, and were soon back with the main party again. After a brief rest, during which we developed the whole of our photographs, we all set off once more on the long journey across the plains of Tibet. After an uneventful journey we reached Darjeeling again early in August. Our journeyings were now over for this year, but still we had the joys of being in a civilized country again, and were able to appreciate them all the more.

Before the paper the PRESIDENT said: The paper to-night by Captain Morris is upon the Arun gorge, and I ought perhaps to explain at once that the Arun river of which Captain Morris proposes to speak is not the river in Sussex, and the gorges of which he is going to tell us are not, therefore, some geological freak upon the estates of the Duke of Norfolk. Captain Morris, as you no doubt all know, was a member of the last Mount Everest Expedition, and to his credit lies one of the most distinctively geographical pieces of work which that Expedition accomplished. The Arun river which he is going to describe rises, as a matter of fact, on the northern side of the great Himalayan watershed, and it forces its way south through an immense gorge in that watershed. In the course of some 20 miles it drops something like 4000 feet, and Captain Morris's purpose when he undertook this piece of exploration was to ascertain, so far as possible, the nature of this remarkable gorge. He will, no doubt, be able to illustrate his remarks by a series of photographs of the wonderful scenery which he encountered in the course of his journey. I now have great pleasure in asking Captain Morris to give us his description of the gorge as he found it.

Captain Morris then read the paper printed above, and played on the piano a number of Nepalese airs which he had recorded.

The PRESIDENT: I am sure we all regret that Captain Noel, whom Captain Morris accompanied, is not able to be present this evening to add anything to what his companion has told us of their journey. But we are singularly fortunate in having with us to-night Sir Charles Bell, whose knowledge of Tibet and the adjacent regions is perhaps unrivalled. He has recently spent

LOOKING SOUTH FROM ABOUT THE MIDDLE OF THE GORGE

THE ARUN FOREST: END OF THE TRACK AFTER THE SECOND DAY'S MARCH

LOOKING SOUTH FROM ABOUT 4 MILES NORTH OF KYIMA-TENG

LOOKING NORTH UP THE ARUN FROM KYIMATENG: FALL OF TSANGA IN BACKGROUND

a prolonged period, a year or more I think, in Lhasa, and I shall be glad if he will say a few words on the subject of the paper of this evening.

Sir CHARLES BELL: The lecture that we have listened to this evening has brought back very vividly to me the twenty years or so that I spent in Tibet and on the Tibetan borderland. I propose, with your permission, to say a few words upon one or two of the many interesting points which our lecturer has raised. He was talking, among other things, about the grazing settlements. Those settlements are typical of Tibetan life, because the Tibetans at first were entirely a grazing people and at a much later period in their history took to cultivating the soil. As far as my experience went, the practice was for the settlements to move up a valley further and further as the summer advanced, usually staying about a month or six weeks in each place. They would start—in north Sikkim or in Tibet—at an elevation of some 8000 feet in March, and gradually move up to 13,000 or 14,000 feet by July. Then, as the winter approached, they would gradually come down again.

Captain Morris referred to the number of abandoned or semi-abandoned trade routes that he found. I do not wish to dogmatize, but I would suggest that this abandonment may be due, at any rate in part, to the opening of the British trade route through the Chumbi Valley. This latter attracts more and more of the Tibetan trade every year. The trade between Tibet and India passes over a frontier about 2000 miles in length, and half the total amount of trade comes down the Chumbi Valley. Gurkhas have often told me that the opening of this Chumbi Valley route has more and more destroyed their own trade routes, because the people have deserted their rough tracks and gone down this better road.

I was much interested to hear about the gigantic lily of which Captain Morris showed us such a lifelike picture, for this beautiful flower is to be found in north Sikkim also. I have seen it 6, and perhaps even 7, feet high with extraordinarily beautiful flowers which grew two and two a long way down the stalk. Another point on which I would venture to confirm what the lecturer has said is as regards the different Nepalese languages. As he has rightly told us, the different tribes of Nepal each speak a dialect of their own; and he has further informed us—a point on which I was ignorant—that the sub-tribes even have languages of their own. These languages of the different tribes of Nepal are almost the only languages outside Tibet that are closely connected with Tibetan. The language of the Khas tribe is of course derived from Sanskrit. It often happens in Tibet that after going a very short way, crossing perhaps a range of hills into another valley, one finds a marked difference in the dialect. Of course there are no railways in the country to unify these differences, and even no roads as we understand the word "road." The porters who worked for the Mount Everest Expedition, although they belong to a Tibetan tribe, yet when they go to Lhasa, are not understood by the people there. They have to find somebody to interpret for them until they can learn to speak the Lhasan dialect. So far does this difference of dialect go that the Tibetans have a proverb in which they say, "Every district its own dialect; every priest his own doctrine."

It was of especial interest to me to hear about the Arun country, in which I have never been myself, because it was in that part of the world that in the year 1792 the Chinese conducted a military expedition which has become famous in history. It was about 1791 that the Gurkhas, who had then newly come into their power in Nepal, made an expedition into Tibet and raided the highly venerated monastery of Tashi Lhunpo, the seat of the Tashi Lama

near Shigatse. The Chinese organized an expedition against them. In European books the numbers engaged in that expedition have been greatly exaggerated: nevertheless it was a considerable expedition and was composed of both Chinese and Tibetan soldiers. The expedition, as you know, marched across the whole of Tibet from the Chinese border, some 2000 miles at least, defeated the Gurkhas in several engagements, and finally dictated an ignominious peace almost within sight of Khatmandu, the capital of Nepal.

When I was in Lhasa a couple of years ago I saw various monoliths there with historical inscriptions, and among them was one which recorded the defeat of the Gurkhas. According to the usual Chinese practice, they were in high-flown style. I had a translation made, and in it I read, among other flowery praises, that the glorious army "crossed the mountains, so difficult to travel through, as if they were traversing a level plain; they crossed rivers with great waves and narrow gorges as though they were mere streams: they fought seven battles and gained seven victories."

We have had a good practical account of the Arun river from our lecturer this evening. Tibetan accounts of their own rivers are sometimes inclined to be fanciful. The Tibetans believe that four large rivers rise from that mountain in western Tibet which the Indians know as Kailas and which the Tibetans know as Kang Rimpo-she, "The Snow of Great Price." Of those rivers we are told that "The first proceeds from the mouth of a horse and flows through Tibet, the land of horses; the second comes out of the mouth of a lion and flows through Ladakh, where men have the strength of lions; the third issues from the mouth of an elephant and flows through Nepal, the land of elephants; the fourth proceeds from the mouth of a peacock and flows through China, the land of beautiful women." Whatever the other rivers may have achieved, I cannot help feeling admiration for the river that flows through China, because, in order to reach China at all, it would have to climb over or burrow under three of the most substantial mountain masses in Asia.

The PRESIDENT: Major Morshead, who was a member of the Mount Everest Expedition of 1921 and 1922, is also present, and in asking him to say a few words I would at the same time congratulate him upon his recovery from the severe attack of frostbite from which he suffered.

Major MORSHEAD: I am afraid I have nothing to add to the interesting lecture we have had to-night.

The PRESIDENT: Then I ask Prof. Turner, the Sanskrit scholar, who has recently made an extensive study of Nepalese languages, whether he would add a word or two.

Prof. TURNER: I feel, after you have heard Captain Morris and Sir Charles Bell speak of this country of Tibet where it neighbours Nepal, that I have no business at all to address you; for the nearest I have been to Tibet is but to see its snows from India, and the furthest that I have been in Nepal is but a few yards when I walked along the ridge which separates British India from Nepal on the Darjeeling side, and where every now and then the path passes to the Nepal side of the boundary pillars. But as I listened to Captain Morris's rendering of those Rāi songs I felt I had but to shut my eyes and I was back again on that mountain path, the mists surrounding me, with now and then a clearance through which I could look down into one of those mysterious valleys of an almost unknown land, while high above, coming down the path from some distant valley on a four or five days' march to the nearest market, there was a party of Rāini girls singing such songs as Captain Morris gave us.

There is one point I might elaborate which both Captain Morris and Sir

Charles Bell spoke of: the history of the languages spoken in that part of the world. They both mentioned languages in the plural and I repeat it, for, as we were told, the languages spoken there are almost innumerable. Not only are conditions so different from what we are accustomed to in Western Europe where the same language may be spoken by millions of people in more or less the same form, whereas there there are a great many languages differing, as we have been told, from valley to valley or even from village to village, but the matter is sometimes even more complicated, and where the speakers of one language have migrated, for some reason or other, you may to-day find living in the same village, side by side, families speaking languages completely unintelligible to each other. So that a household may have one language as its mother tongue, while the next household has another language as its mother tongue, and neither could understand the other unless they had a third language in common. And if you will permit me for a moment to take up your time I should like to tell you how it came about that they have this third language in common.

All these multitudinous languages—and the Linguistic Survey of India speaks of at least twenty different languages in Nepal alone, all mutually unintelligible—which are spoken from the far north-west in Baltistan to the far south-east in Burma, belong to a family commonly called the Tibeto-Burman. They are connected, on the one hand, with the Tai languages to which belongs Siamese, and, on the other, with Chinese, and the whole are sometimes grouped under the name of Mongolian or Indo-Chinese. The Mongolians coming from the north and pressing down into the more fertile valleys on the southern face of the Himalayas, spoke probably a language which was sensibly the same. But, as the pictures that you have seen to-night have shown you, the country is such that communication is difficult in the extreme, even if, unlike the Tibetan governor, you are willing to move on your feet, and at the same time there has been no political power stretching over that whole extent of country which would hold a community together. The result was that in course of time this extraordinary diversity of language developed, just as in Europe the Latin language, which was spoken over the whole of the Roman Empire, diverged with the break-up of that empire into the various Romance languages of to-day. Such a state of affairs in which the people of one valley speak a different language from the people of the next and two households in the same village may have different languages is not likely to be stable when it comes into contact with a higher civilization. And what we can observe to-day is a process which has been going on for a considerable number of centuries. The Mongolians pressed forward on to the southern slopes of the Himalayas from the north, and at the same time there were peoples moving into and along the mountains from India. These people whose languages are spoken over the whole of North and Central India entered India from the west, and their language, called Sanskrit, is of the same stock, the same family, as our own or as Latin and Greek, and very nearly the whole of the population of Northern and Central India now speak languages descended from this one language, Sanskrit. From the earliest times after their arrival in India these people, called the Aryans, tended to press up into the mountains up the lower slopes of the Himalaya, and at a comparatively early period, certainly by 600 A.D. and probably several centuries earlier, they had already reached this mountain land of Nepal. They bear the name of Khas, a word which you can find in the names of various tribes and castes along all the southern slopes of the Himalaya, and which occurs again probably in the name of the country Kashmir,

and possibly of Kashgar; Pliny mentions it in his geography as the name of a tribe in northern India, the Cesi. Those people speak an Aryan language descended from Sanskrit, and that language they call Khaskurā, the language of the Khas; or Parbatiyā, the language of the mountains; or Gorkhāli Bhāshā, the language of the Gurkhas.

About the middle of the eighteenth century a Khas tribe speaking this Aryan language, who were settled round the little town of Gorkhā in Nepal, gained under their leader, Prithivā Narāyan Shah, the ascendancy in the valley of Nepal where lies Khatmandu, and from the valley of Nepal they spread their power over the whole of what is now Nepal, and at one time far exceeded its present boundaries until their power clashed with that of the Honourable East India Company. Their language, an Aryan language descended from Sanskrit, being the language of the ruling caste and of government in Nepal, has tended, and is still tending, to oust all the various disjunct Mongolian dialects and to become among the people the common means of communication, so that now where you have one household speaking a language quite unintelligible to its next-door neighbour, they both have to learn Khaskurā in order to communicate with each other. This is the language, often I must confess in a very mutilated form, which is used as the general means of communication in the Gurkha battalions of the Indian Army.

I think possibly a future historian may draw attention to this one small point, that here in India we have been in close alliance for a century with a country with which our borders march for over 700 miles, from which we have drawn many thousands of men to serve in our Indian Army, and yet, if you will forgive this anti-climax, of whose language we have never yet produced a dictionary. It is true that some vocabularies have been made, but nothing like an attempt at a complete dictionary of the language has yet been published, and the reason of that is the reason of so many other of our present difficulties, the lack of funds.

I do not know, my lord, whether before the Royal Geographical Society I may turn from this short excursus on the language of the people of whom we have been hearing to-night to say a few words on one of their other activities. Captain Morris has told us of the people of Nepal, and he has shown us such very charming photographs of some of the individuals, that I feel I may be forgiven. We have heard to-night casual mention of the Gurkha battalions of the Indian Army. I feel that the British public at large have no clear realization of what the inhabitants of that little strip of country—it looks little enough on the map though it is 700 miles long—have done for us in the last few years. The population of Nepal is estimated to be not more than 3,000,000 people, and of that probably less than half belong to the fighting tribes. And yet during the years of the war 200,000 men were recruited from that country to help us; 55,000 were actually enlisted in the Gurkha battalions of the Indian Army. We had a certain ideal, perhaps, before us, and they too had their ideal—not the same as ours: it was the ideal of being true to their salt. When General Bruce came back from the Mount Everest Expedition he opened in Darjeeling a memorial to the Gurkhas who had fallen in the war. It was a Rest House for those widows and orphans who come down from the mountains to receive their pensions from the British Government year by year. In the middle of the courtyard there is a pillar on which is this inscription in Khaskurā: "To all the Gurkhas who in England's Great War between 1914 and 1918 passed to the other world this dharmsala is built." The bodies of those who thus passed over fell in many parts of the world. Gurkha soldiers were to be found

NEPALESE (RAI) FAMILY FROM DHONKUTU AT SUMMER GRAZING CAMP IN THE ARUN VALLEY

CAMP IN THE ARUN FOREST WHERE TRACK ENDED ON SECOND DAY S MARCH

ENTRANCE TO CENTRAL GORGE, LOOKING SOUTH FROM MIDWAY BETWEEN KYIMATENG AND TENG

NORTHERN ENTRANCE TO ARUN GORGE, LOOKING SOUTH FROM TENG

cheerfully enduring tropic heat or the cold of the northern winters or the thirst of sandy deserts. Almost wherever there was a theatre of war Gurkhas were to be found, and everywhere they added only lustre to their name for high courage. Gurkhas helped to hold the sodden trenches of France in that first terrible winter and during the succeeding summer. Their graves are thick on the Peninsula, in Sinai, and on the stony hills of Judæa. They fell in the forests of Africa and on the plains of Tigris and Euphrates, and even among the wild mountains that border on the Caspian Sea. And to those who know, when they see the map of that country which we have had before us to-night, of Nepal, there must always recur the thought of what the people of that country have done for us.

The PRESIDENT: In conclusion, I would ask Major Wheeler, a member of the Mount Everest Expedition of 1921, who did the photographic survey of the country, if he would say a word.

Major WHEELER: I am afraid I have very little to say with regard to the paper we have heard to-night; although I was in Tibet in 1921, I looked at the the Arun gorge only from the village of Teng, which is quite a long way off. I was, however, very much interested to hear Captain Morris's description of the Expedition up the gorge, and to see his beautiful pictures. There is only one point in his paper that I would like to refer to: that is his remark as to having to wait sometimes an hour before taking one snap-shot. From my own experience I think that he was extremely lucky, for I found many times that I had to sit on the top of a mountain for nearly a whole day in order to get one picture!

The PRESIDENT: In thanking Captain Morris for his lecture this evening I would venture to congratulate him upon the success of the experiment of interposing a brief musical interlude in a geographical discourse. I was particularly interested in the tunes of the folk songs which he gave us, because I always found an immense attraction myself in the music of the people of the eastern Himalayas, and I can certainly confirm what Captain Morris said as to the curious resemblance which the music of these mountain peoples often bears to the music of our own mountain peoples in the United Kingdom, the people of Scotland. Not only do the tunes bear a strong resemblance to many Scottish airs, but the people of Sikkim, at any rate, possess instruments which recall to any Scotchman very vividly his own national form of music. They have a combination of two instruments, one of which produces the exact sound of the drone of the bagpipe, and when that is combined with a particular form of horn it is almost impossible, if you shut your eyes, to doubt that you are listening to the familiar drone of the pipes. So much so that one of the constant companions of my rambles in those parts of the world, a Scotchman and an elder of a Scottish kirk who figures under that title in a recent publication of my own, was on one occasion misled into believing that the inhabitants of a certain village, out of courtesy to our nationality (which was probably quite unknown to them), were regaling us with a rendering of "Scotland for Ever."

In bringing this Session to a close may I venture, on your behalf, to assure Captain Morris that the concluding lecture of a Session during which we have had many interesting accounts of a number of out-of-the-way parts of the world, has been by no means the least interesting.

AN EXPEDITION TO GRAHAM LAND, 1920–1922.

M. C. Lester, Lieut. R.N.R.

THE original members of the expedition were: J. L. Cope, leader, formerly with the Ross Sea party on the Shackleton Expedition of 1914; G. H. Wilkins, second in command, who was with Stefansson's Expedition in the north; T. W. Bagshawe (Gonville and Caius College, Cambridge), geologist; and myself as navigator.

Previous to 1920 Mr. Cope conceived the idea of extending the discoveries of Nordenskjöld; that is to say, he intended to continue the mapping of the western coast-line of the Weddell Sea, and if possible link up the termination of the Swedish Antarctic Expedition's survey (1901–3) with the Caird Coast discovered by Shackleton in 1914.

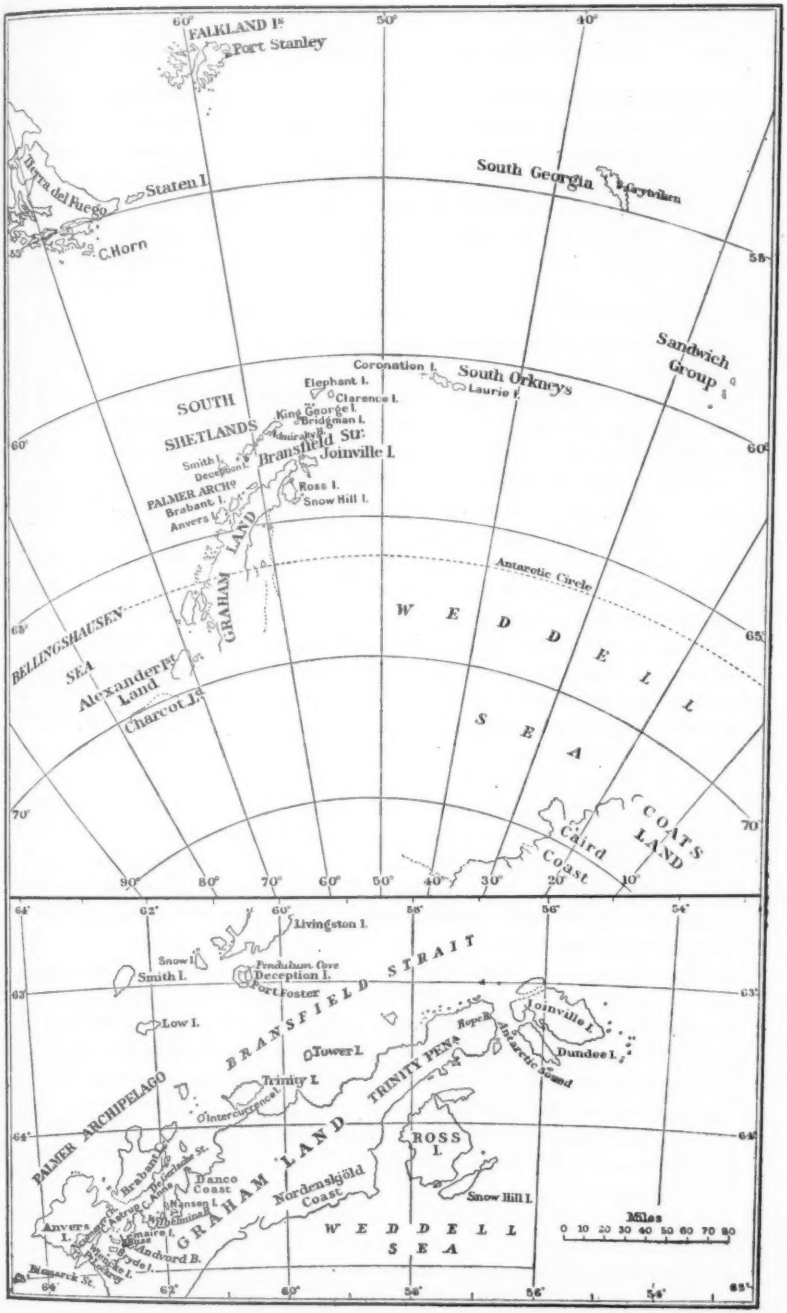
With this object in view preparations were made, food and sledging equipment were obtained both from England and Norway; arrangements were made by courtesy of certain Norwegian whaling firms for the members of the party to proceed south in their whaling factories, and by October 1920 the party was ready to leave England.

On 28 September 1920 the leader left for Norway, and after completing the necessary arrangements he sailed for America in the factory *Thor I.*, where, after meeting Wilkins and transhipping to the *Solstreif*, they proceeded south together.

Bagshawe and I left with our share of the stores ten days later, sailing in the whale factories *Svend-Foyn I.* and *Orn II.* respectively.

We arrived at our destination at different times, and it was not until just before Christmas that we were all together at Deception Island, South Shetlands. It was then that Bagshawe and I discovered that Wilkins had been unable to accomplish his task of procuring proper sledge dogs from the Hudson Bay Company, and that we had in their place eight dogs bought from residents in the Falkland Islands. However, since Nordenskjöld's party succeeded very well with similar animals some years before, we did not regard this change as greatly detrimental to our plans.

Previous to our departure from England, an agreement had been arrived at with the whaling captains to the effect that if the season's ice-conditions proved favourable, we should be landed at Hope Bay. This place lies on the eastern shore and just inside the Antarctic Sound. At this point we had proposed to make our first depôt, and then from there and by means of our sledge boats move a large bulk of our stores and provisions to Snow Hill Island, some 30 to 40 miles further south, and create a second depôt, using the hut of the Swedish Expedition as our headquarters. From this main depôt, it was proposed to commence the long sledge journey along the Weddell Sea coast-line. We had allowed a sufficiency of provisions to carry us through an extra year in the event



Sketch-map of the Falkland Islands Dependencies and Graham Land.

of a vessel being unable to approach Hope Bay the following season, to which we had hoped to return after the accomplishment of our work. We had an abundance of pemmican, which would have lasted the four of us very much longer if the occasion had arisen.

Our first move should have been to have ourselves, dogs, and stores taken to Hope Bay as soon as possible since the summer was already well advanced. It was at this stage that the real misfortune of the expedition took place. The whaling captains had, in view of the known bad ice-conditions which exist in the Antarctic Sound, made the proviso that they could not promise to land us at Hope Bay, but would try to do their best.

A whaling catcher's time occupied on other business than whale hunting meant a serious loss of money, so that when ice was seen on the horizon and in the direction where we required to go, it was not thought advisable, from the point of view of the whaling captains concerned, to lose valuable time in taking us towards Hope Bay with the possibility of having to bring us back again. In short, if this region had been clear of ice they would undoubtedly have landed us, but the fact of ice being present did not make them feel justified in losing their time to find out whether it was navigable or not. If all our party had been of the same opinion, it is possible that our combined urgent desires to be landed at Hope Bay would have been given greater consideration by the whaling people, and an attempt at least would have been made by them; but unfortunately the second in command considered that landing at this point of departure was an unnecessary step. There being no longer a unity of purpose between the members of the expedition, it became a less difficult task for the Norwegian captains to fix another and only alternative, *i.e.* to land on the western side of Graham Land.

The landing was accomplished on 12 January 1921 through the kind efforts of Captains V. Hansen, O. Anderson, and Larsen. Each captain lent one of his whale catchers for the purpose of landing the expedition's equipment.

Our base was on Danco Coast, lat. 64° 48′ S., long. 62° 43′ W., only from 30 to 40 miles to the westward of the point we desired to reach, *i.e.* the end of Nordenskjöld's exploration; but between us and that point there arose a range of mountains from 2000 to 6000 feet in height, steep, rugged, and covered with glacier. Thus the plans of the expedition received a severe check at the outset.

If it had only been a question of reaching the other side, I feel sure that a way could have been found, providing that we took no more with us than packs and perhaps a light sledge; but to reach the other side with little equipment and with only enough food to enable us to return was to defeat the real object of the expedition, which was to continue the Swedish explorer's work.

For seven weeks, during which time the four of us were together, and

immediately after our base had been made, we set to work to explore the coast-line and try to find a possible place where we might try to get ourselves, dogs, and stores over those mountains which barred our passage to the Weddell Sea. This exploration was accomplished in a 20-foot lifeboat with little opportunity for sailing, but with much pulling and hard work. At the foot of Andvord Bay, just to the north and east of our base, there was what appeared to be a plateau which gave good promise of perhaps extending to the other side. If we could have got on to the top, we might have seen the Weddell Sea and our goal within reach. But although this promise of success cheered us, nowhere could we find a roadway possible for four men handicapped with eight dogs and the equipment we should have to take—nothing but steep sides and a maze of crevasses faced us. Week after week went by, and although the leader appeared optimistic and prepared the sledging rations and so forth, yet it soon became apparent that our failure to be landed at Hope Bay in the first instance meant the doom of the original plans.

At the end of February 1921 therefore, after deliberation, it was agreed that the leader should return to civilization, obtain a small suitable vessel, and come back as early as possible in the following spring, and then with his own ship make his way to Hope Bay. At the time of this arrangement Wilkins expressed an opinion that nothing useful could be accomplished by staying behind, and after endeavouring to persuade Bagshawe and myself to give up the plans, he decided to leave the expedition and return north with the leader. Bagshawe and I had expressed our willingness to assist Cope by remaining for the winter and so carry on as much as possible the scientific work, and also to take care of the dogs and stores. In this way the expedition, although prolonged, would be continuous and not broken up at the outset.

It was necessary to find the whaling people and notify them of our alteration in plans and request them to take the leader to Montevideo on their way home. It was therefore agreed that Bagshawe should remain behind to look after the dogs and continue the meteorological observations, whilst we three departed in the lifeboat to look for the whaling factory.

We first went to Nansen Island, but failing to find the ship required we were obliged to proceed south again to Port Lockroy, where we were received most kindly by Captain B. Hansen and the officers of the whaling factory *Solstreif*. Later a whale-catcher took us back to the base, where Bagshawe was most pleased to see a human being once again. He had been alone for almost a week, and was naturally most anxious all the time concerning our welfare. During our absence we had spent nearly four days in the lifeboat, and had covered a distance of about 90 miles.

The usual little happenings which are incidental to such a journey and in such waters were not lacking on this occasion. We had to spend

our first night, after a very hard day's rowing, in Wilhelmina Bay. We were obliged to drift and wait for daylight, as the weather had set in very misty and we had temporarily lost ourselves. It is on such an occasion, when icebergs appear suddenly and mysteriously, when strayed penguins "caw" to one another and seals "whistle," and when the terrific breathing of a whale which is resting on the surface is heard only a few feet away from the boat, that one is forced to put aside his personal discomforts and misgivings and is made to appreciate the beauty of an Antarctic night. These weird sights and sounds are so much in keeping with the primordial surroundings. Another cause for excitement during that night was when a school of Fin whales passed right under our boat, and so close that their gigantic bodies were outlined as they disappeared under the keel. They produced considerable disturbance on an otherwise calm sea.

On our way to Port Lockroy from Nansen Island, and after rounding Cape Anna which is on the eastern side of De Gerlache Strait, we made a fast run with a strong wind on the starboard quarter for 20 miles right across the strait and until abreast of Cape Astrup, the northern extremity of Wiencke Island. We then entered the Neumayer Channel, and the wind, which had by then developed into a moderate gale, was behind us and forcing us along at such a speed that we deemed it advisable to shorten sail, as there was much floating ice about which could not be seen until nearly on top of it. It had by then become very dark, and at such times it is impossible to gauge the shape or judge the distance away of a glacier front. Both sides of the channel appeared to merge into one continuous line, and because we were much nearer to one shore than we supposed this effect was exaggerated, and many times during that night we thought that we had got into a *cul-de-sac* at the end of which there was nothing but a sheer ice-cliff with the sea breaking at its foot.

In the early hours of the morning, when trying to make a landing in order to breakfast, we grounded on a submerged reef close in to the shore. A heavy sea for our boat was experienced, and we were threatened with being capsized. Eventually we half filled with water, but by means of rapid baling and the jettisoning of our pemmican ballast we managed to get off again, but not without becoming thoroughly wet and sustaining damage to the boat.

The leader and Wilkins accompanied me back to the hut, and after they had collected their belongings and had bidden us farewell, left again in the catcher to return to the *Solstreif*, where they awaited her departure for the north. We were left on 4 March 1921, and on the next day Captain O. Andersen, of the *Svend-foyn I.*, whom I had seen on my recent visit to Nansen Island, came down to see us, as arranged. After further counsel about the inadvisability of only two individuals remaining south all the winter, he repeated his promise that if the leader was unable to procure a ship in time for our relief, he himself would come to our

rescue the first possible opportunity in the following season. As things turned out, Mr. Cope was unable to charter a vessel, so Captain Andersen of the factory *Svend-Foyn I.* kept his promise and effected our relief on 13 January 1922. We spent three months with the whaling fleet before we commenced our return journey, and did not arrive in England until 16 June 1922.

After the departure of Captain Andersen we immediately settled ourselves down to the idea of not seeing another man for at least ten months. We had to prepare for a ten months' sojourn at "Water Boat Point," the name of our base. We had not a proper hut, but by building a house made from cases of provisions over an old water-boat, and using the latter as a bedroom and a place for stores, we managed to make ourselves quite comfortable. The general superstructure was of course erected while the four of us were there, but a great deal of work had to be accomplished to render it suitable for winter habitation, and an extra hut had to be built adjoining for working in during the cold months. Every case forming part of the walls was battened to the next; the cracks in between were filled with sennigrass and covered with strips of canvas to keep out snowdrift, whilst the whole erection was given a canvas covering which was painted with a mixture of paint and seal oil. Food had to be stored to cover a period of at least nine months for eight dogs and two men. This necessitated the killing of thirty seals and two hundred penguins.

Together we worked for many weeks, strengthening the hut, stowing away provisions, stacking coal, making dog kennels, collars, and also articles for domestic use. It should be remarked here that our idea had not been to establish a base for permanent use, but to sledge; hence we lacked a great many things of a domestic kind, and still more unfortunate was the almost complete absence of any standardized instruments so essential to base work, especially for meteorology.

By constant hard work (and scientific observations were not neglected during this period), we were prepared by the time the first severe winter blizzard reached us. The dogs were housed and the outside work was completed.

The water-boat, which rested on a narrow neck of land and but 2 or 3 feet clear of high water, was 27 feet long and had a beam of 10 feet. The inside height was only 3 feet 2 inches, so that one had to crawl round like a seal when down below. The area of the "lounge" (within that portion of the superstructure which rested on the boat deck) was 6 feet by 6½ feet, and was fitted up with eiderdowns and skins and contained our library, gramophone, etc. The kitchen, into which we descended by steps from the lounge deck, was 6 feet square. A quarter of this space was taken up by a large kerosene drum, which was fashioned into a stove and inside of which was placed a bucket punched with holes and sup-

ported on bricks. This bucket, which contained the fire, gave off most of its smoke into the hut instead of up the chimney. The lack of ventilation and the absence of windows caused us to suffer from bad headaches and sore throats. Beyond the trouble produced by the smoky atmosphere we had no illness whatever, and we attribute this fact to the simple diet of pemmican, seal, penguin, ship and polar biscuits, and tea, with a little jam occasionally. Throughout the many months which followed, seal and penguin meat was eaten on alternate days until the latter became too bad for consumption, when it was replaced by beans or sardines—the latter fried. Pemmican formed the principal article of diet, and was appreciated the most. When in due course the penguins returned to the base and laid their eggs, we lost no time in substituting this form of food for seal, which had by that time also become ill flavoured. Strict abstinence and regular exercise also helped to keep us in very good health. I would mention here that the dogs were snowed up nearly every day of the winter, and their everlasting success at breaking loose, to the detriment of small bands of penguin visitors, gave us more than enough exercise. We had no tinned meats, which was a very good thing, as it compelled us to live on the flesh of the land, which being fresh was conducive to good heatlh and ensured freedom from scurvy. We were not only the first British party to winter on this side of the Antarctic continent, and the smallest which has ever been south, but I think that we hold a record by having kept completely free from scurvy.

Our base was upon an island about 200 yards long ; a much smaller island to the south of us was separated by a very narrow channel. During neap tides and at low water, a bar connected and enabled us to walk dry-shod to the mainland, the glacier of which was quite close and to the eastward of our hut.

During the winter we experienced about twenty hours of darkness, and the remaining four, if the weather was bad (as it usually was) gave us something a little better than twilight. Our abode being windowless, we were obliged to burn candles inside all day and every day throughout the year.

Our days were fully occupied. Besides the ordinary work of cooking, chipping out enough frozen coal and frozen dog-meat, clearing the hut door and the dog boxes of a night's snow-drift, searching for fresh-water ice for the cooking, and a score of other things had to be done ; there was, in addition to all this, the scientific work to attend to. All our writing was invariably done before supper.

One great source of discomfort in low temperatures was hoar-frost. No matter how well we protected ourselves against leaks, hoar-frost would form and ultimately melt and wet everything in its course. Thus in our bedroom our breath condensed and froze to the ceiling and to the fur inside our sleeping-bags. A rise in temperature brought down an accumulation of hoar-frost adhering to the roof upon our heads,

whilst it became a nightly habit to melt icy patches in the sleeping-bag before going to sleep.

We found that it was very difficult to keep our meat perfectly fresh for any great length of time, even in the winter. This was probably due to the rapid fluctuations and wide ranges of temperature to which it was subjected.

In the beginning of our stay we used to go out in the lifeboat on fishing expeditions, but always returned without any fish, in spite of a variety of bait and a good deal of patience. Apparently there were very few, if any fish at all, in the locality in which we lived. The reverse was the case at Deception Island, where the whaling people had a regular fishing ground in the vicinity of the entrance to Port Foster, and fish were caught as fast as the lines could be put over the side. These fish were most excellent to eat, like plaice.

On many occasions during the summer-time we went out boat sailing in the course of our coastal exploration, and we found that the winds were most treacherous. Usually gusty, the wind would spring up with extraordinary rapidity from any quarter and shift with equal suddenness to another without any warning, and it was impossible to pay too much attention to avoid the possibility of being capsized. The mountainous surroundings were undoubtedly the cause of this.

The opportunity for scientific research was limited since the expedition's scientific equipment was only intended for sledging; in addition to which our field of work was small. Nevertheless we did what we could and carried out systematic work as follows:

Meteorological observations were taken every two hours from 8 a.m. to 8 p.m. During the tidal observations, conditions were recorded every two hours throughout the day.

Tidal observations were taken for forty days; hourly, night and day.

Ice movements were recorded and charts were made daily to show its position and to determine currents; also "current bottles" were launched.

A small amount of survey was accomplished, including a complete plan of "Svend-Foyn" harbour, Nansen Island.

Numerous notes were collected and drawings made for the possible improvement of existing charts of the whaling areas of the South Shetlands and the Belgica (Gerlache) Strait.

Many notes were gathered when with the whaling fleet, both from observation and from information obtained from the whaling captains, concerning whaling areas, harbours, occurrence of whales, whaling organization and method of hunting.

Geology was made a special study and numerous specimens were brought back; also notes and sketches were made on glaciology.

A careful record of the bird and animal life was kept, including a special study on penguins.

A complete set of fifty penguin embryos of Gentoo (*Pygosceles papua*) and Ringed (*Pygosceles Antarctica*) were collected.

Travelling on salt water or sea ice is at the best of times rather precarious, and because there were only two of us, it was a difficult matter to go very far from the base, since, if our return journey happened to be cut off by the departure of the ice, there was no one left behind to effect our rescue; in addition to which some of our dogs would have been deprived of food and attention. Therefore, taking everything into consideration, we felt that there was nothing else to do but give up a much-cherished idea of making several trips to the southward of our hut. Nevertheless we managed to make one short journey on August 24, when we were able to test the ice conditions and also to add considerably to our geological collection. A few days earlier we tried the ice close in to the glacier and found that travelling without either showshoes or skis was difficult, as many soft spots on the surface threatened to let us through. But on the day of our short sledge journey we found the surface excellent for travelling with snowshoes. It seems remarkable, when there is such an easy method of progress by snowshoes, either over rough or smooth, soft or hard snow and ice, that so many expeditions have preferred to use skis, which are not only much heavier, but require a great deal more practice before an efficient use can be made of them. With snowshoes one quickly becomes proficient and soon learns (contrary to the use of skis, where the fingers become painfully cold in adjusting the straps) that they can, literally speaking, be kicked on or off at will without the need of strapping and unstrapping and without the aid of one's hands. Also, if the snowshoes are not required, they are easily slung across one's back without feeling any great additional weight.

Although throughout the winter our temperature was, with few exceptions, very much below 32° F., yet the channel to the north of our base was, except for drift and brash ice which occasionally filled the place, in a continual state of open water, and everywhere to the north, as far as we could see, *i.e.* to the main strait, it appeared to be the same. It was only to the south that a permanent freezing over was evident. Unfortunately we were not in a good position to study ice conditions very closely in the main De Gerlache Strait; and it is therefore probable that our notes and ice charts will show only local results. We observed as far as was practicable the varying ice conditions in the Strait, and a systematic record of its movements, for certain periods, has been kept. We could also see a section of the main strait by means of a channel which divided Lemaire Island from Bryde Island. Later we collected many more notes when with the whalers on the ice conditions in the De Gerlache and in the Bransfield straits.

About four days after our sledging expedition wide leads became visible in the ice, and these open-water channels were quickly followed by a general dissolution, and seven or eight days after our journey the

ice had entirely disappeared. This ice took the course usually taken by the unattached masses and proceeded northerly, where it probably joined the main-channel ice, which, unless influenced by adverse winds, is carried with the north-easterly set of current clear of the straits.

We discovered one thing on our sledge journey, and that was that we were much too late in the season in getting away. The ice conditions were the same on the day of our departure as they had been for several weeks past, and we could have perhaps made the journey at a much earlier date.

Starting sufficiently early, a party of say four men with a sledge boat could, as far as we were able to observe, proceed on the sea ice for an indefinite distance southwards and by following the coast-line. Everywhere to the south of the point marking the end of our trip the ice looked firm and flat, and it appeared as if good progress could be made all along and within a few hundred feet of the glacier sides, which ranged from 80 to 130 feet in height. I am certain that a valuable traverse survey could be accomplished by this means and great improvements made to the charted coast-line. The very flat surface of the ice would lend special value to the results obtained from the employment of a sledge-meter. I would add that, in connection with fixing a position by astronomical methods, since the temperatures are never low enough to freeze mercury, a mercurial artificial horizon should be used in preference to a glass one, especially when the support of the instrument is dependent for its steadiness upon the snow, as the latter will cause anything resting upon it to continually alter its level.

It is not safe to keep too close to the glacier foot, because heavy falls of ice weighing hundreds of tons are continually occurring along this coast either at one place or another. This continuous "calving" may possibly be due to the rapid fluctuations in temperature to which it is subjected. Ice is very elastic and will bend to extraordinary angles before the final collapse.

We spent a year and a day at our base, Water Boat Point, and therefore experienced a complete cycle of the weather conditions. We had in our possession a set of Dr. Charcot's reports upon his last expedition (which proved invaluable and helped us out of many difficulties), and we were therefore able to make occasional daily comparisons of the meteorological conditions. We found that the weather experienced during 1908–10 by Charcot was almost identical with ours in practically the same locality and after a lapse of ten years. Taking a retrospective view of the weather we experienced, my impression, generally speaking, is very bad. At no time during the year could the conditions be called very severe, but they were trying in the extreme. The very great and rapid fluctuations in temperature, with the consequent freezing up and thawing out of everything, the almost incessant winds and overcast sky

accompanied by heavy precipitation and thick weather, were detrimental to our work and would prove trying to the most philosophical of minds. The continual changes in the temperatures gave us little opportunity of becoming acclimatized. For instance, in July and during an interval of only twenty-four hours, a change of wind from the north-east to the south-west quarter brought a temperature of plus 28° F. down to minus 11·5° F. in the course of a single day. Degrees however represented little in the matter of personal sensations, and a high temperature of from 25° F. to 35° F. accompanied by a wind and a saturated atmosphere was infinitely more trying than a calm or even a moderately windy day, but with a perfectly dry atmosphere and with a temperature ranging between say plus 10° F. to several degrees below zero ; in fact, under the latter conditions existence became cheerful.

The following will give a general impression of the weather experienced at our base :

From January to March, light to moderate winds, mostly from the south-west, but also very frequently from the north-east quarter, were experienced and the weather was generally very dull. Snow began to fall appreciably in March and the wind became stronger. In April the wind was more frequent, and the prevalent quarters from which it came were again south-west and north-east. Wind from the latter direction brought much snow, which from about that time onwards remained on the rookery. During the following months of May and June the snowfall moderated a little, but the wind increased in frequency and velocity, and June was known as a windy month. We experienced throughout a great deal of dull weather.

In July, when the minus temperatures began, the wind came mostly from the south and south-west and was light to moderate, but increased in force and became gusty towards the end of this month. Much snow fell and snow-drifting began to make itself evident. The month of August produced the best weather, there being little wind or snow, whilst the air, which was dry and cold, was clear and the weather was very fine. We had no more minus temperatures after this month. September was also a fine month except for the last week, when snow again began to fall, this time in earnest, and heavy drifting was experienced. The prevalent winds for the last two months came from the south-west and south-east and were for the most part light, although it was during September that we had our strongest wind of nearly 70 miles per hour, which came from the south-west. For the last three months of the year the winds, which were strong and frequent during October, rapidly diminished to moderate and light winds, and snowfall became less and less. In December the weather showed signs of improvement, but it was still nearly always dull and overcast. Throughout the whole of the year, except for the month of August, the wind came frequently from the north-east quarter, bringing with it snow and thick weather. It was

almost invariably heralded by a falling barometer and a rapid rise in temperature. Similarly, a rising glass and a fall in temperature warned us of the approach of a south-west disturbance, and it seemed as if the wind from this quarter sent all the snow and thick weather, which came from the north-east, back again.

Sudden changes in the direction of the wind were frequent, and from no quarter could it be said that it blew steadily for any length of time ; it was nearly always gusty, and the gusts from the south-east, and especially from the east, were the most violent of them all. This, as already explained, was probably due to the mountainous surroundings in which we lived.

With the exception of the penguin inhabitants at Water Boat Point, no other bird species appeared in our locality in any great number, and, strange to relate, only on one occasion at the end of December 1921 did we see two or three Cape pigeons. Of all the birds which visited our locality and of which I give a list below, only one type remained with us throughout the winter, the Sheathbill. This small bird with full white plumage lived in the vicinity of the base and fed on scraps of seal meat left by the dogs and upon anything that it could steal. In one way they were a great source of trouble, for scenting the seal-oil on our canvas roof they devoted much of their time in trying to peck through it. They varied in numbers present from two to about ten. We saw also the Black-backed gull, Giant petrel, Antarctic petrel, Snowy petrel, Wilson's petrel, Skua gull, Shag, and Tern.

During the winter months, occasional small bands of Gentoo penguins paid us a short visit, arriving for the most part at dusk and departing at dawn if the weather was fine. Never on any occasion did we see the Ringed penguin, which is apparently much more sensitive to the cold weather, as this penguin did not return to its nesting-ground until long after the Gentoo, not arriving until the beginning of November. With the very gradual arrival of the Gentoo penguin, which became noticeable about the second week in December, the Black-backed gulls and several petrels reappeared, to be followed at a later date by the Skua gull, one of the enemies of the penguin chicks.

The Weddell seal was always a fairly frequent visitor to our shore, although during the winter a long lapse of time would occur without seeing a single one. Neither at our base nor at Nansen Island or elsewhere in this region did we ever see them in large numbers ; on rare occasions we saw as many as five or perhaps six at one time, but more often just one solitary individual. Only once during the month of September (?) did we see a female Weddell seal with young. The hair of this particular seal is coarse and of no commercial value. We never encountered the fur seal, and the whaling people are of the same opinion as the authorities at home, that this valuable seal has become quite extinct in this part of the Antarctic, due to the absence of pro-

tective laws in the early days when this species was hunted with a total disregard to the preservation of its kind.

Another type of seal with which we came into contact was the Crab-eater seal. Several times this seal was seen resting on the ice close to our base. It can be recognized by the very light yellowy colour of its hair, and also by newly made wounds or else old scars covering its body. It is not exaggeration to employ the latter means of identification, for in our experience practically every Crab-eater we saw showed signs of having either recently or at some distant date been severely bitten by the Killer whale. In some cases fresh slashes were seen about 2 feet in length, right across the body and bone deep. It would appear that the habits of this creature lead it very much into deep water, thus rendering it more liable to attack than other seals.

Of the Sea-elephant, the breeding-grounds of which are much further north, South Georgia and elsewhere, we saw quite a few in the course of the year. With one exception, when a male and a female were seen on the island together, they always appeared singly and never during the winter. These animals are big, cumbersome, and long, measuring at times from 17 to 20 feet in length. We have records showing that one of these creatures will stay for days on end on the land, where they will remain in one spot and occupy their time in sleeping.

Lastly, we have many notes gathered from observation on the Sea-leopard; in general appearance this creature resembles the ordinary seal, but it lacks entirely their superfluous fat and their indolent bearing. The Sea-leopard is of a very powerful and muscular build; its length, which is slightly more than that of the seal, terminates in much larger tail fins. Its flippers are longer and obviously contain greater swimming power. The head is long and the jaws contain two formidable rows of teeth, whilst the eyes are deeply sunk and well protected from the possible attack of its prey, the penguin. The Sea-leopard's coat is composed of short hair which wears a glossy appearance and resembles that of the Sea-lion, except that the skin of the former is slatey-grey in colour. Upon the stomach whitish spots can be seen.

Two or three times, when we were engaged in erecting and repairing our "tide-pole," a Sea-leopard would suddenly appear without the slightest warning and come uncomfortably close to us as we stood in water. I am certain that it was only our strange appearance which scared the leopard and saved us from an attack. They will also follow small open boats and coming quite close up will glare with utmost ferocity at the occupants; a jab with an oar will send it away, but it will reappear again to watch, only at a safer distance. They have been seen on rare occasions in Svend-Foyn harbour, where they apparently come for food in the form of whale meat.

The whaling industry has undoubtedly become a great factor in the

settlement of the food question for millions of Antarctic birds. Immediately after whaling had commenced and the carcases were brought into Whalers Bay, there appeared to arrive from nowhere a vast multitude of birds. Never have I seen such numbers as there were in this harbour. There were Giant, Silver, and Antarctic petrels, Black-backed gulls and Wilson's petrels, but these counted for little when compared with the thousands upon thousands of Cape pigeons; the water and air were filled with their bodies, and all had but one object in view, that of feeding upon whale. I have often witnessed the comical sight of two Cape pigeons fighting for the possession of one whale carcase. So great was the number of birds, and so taken up were they with feeding, that it was quite possible by leaning out of the boat to lift a Cape pigeon out of the water. By frightening a few, a roar as of a great storm could be created, because to frighten a few was to scare the million, and the noise from twice that number of wings was terrific. It was light all night long when we first arrived, and the screech from countless throats seldom abated while the light lasted; it was a din which once heard could never be forgotten.

There was a very large penguin rookery on the east coast of Deception Island, consisting principally of Ringed penguins, but having a few Gentoos and a very small colony of Macaroni penguins. During the laying season in the month of November, the whaling fraternity collect every year several thousands of Ringed penguin eggs for food.

The headquarters of the Norwegian's southern whaling industry is Deception Island. In shape it resembles a horseshoe and has only one entrance with towering cliffs on either side and on the south-east corner. The small harbour immediately on the right hand when passing in is known as Whalers Bay, and it is here that all the factories moor and carry out whaling operations. There is in this harbour sufficient room to take half a dozen ships, but of all the factories which usually come to this place at the beginning of the season the factory *Ronald* is the only one which stays throughout the season, and is the only one which has a boiling station on the shore as well as on board. This vessel has almost double the carrying capacity of any of the other ships.

Beyond Whalers Bay lies the crater-shaped harbour of Port Foster. For the most part Deception is entirely covered by glacier and volcanic cinders. According to Mr. Bennett, an English resident at the Falkland Islands, a great deal of steam issues from fissures both on the land and under the water of Deception Island. Also a quantity of sulphuretted hydrogen emanates from the beach at low water. Poisonous gases arise from cracks in various parts of the island. Volcanic cones are found in great quantities, strewn along the beach. The dangers to be avoided in journeying over Deception, when exploring the high lands, are the great fissures or cavities which are lightly concealed beneath a thin

glacial crust. These cavities lie at different depths beneath the snow, and are formed by a process of steaming. Quantities of steam issue from crevices in the earth ; this dissolves the under portion of the glacier, and in some places leaves quite a thin crust of ice just sufficient to support the weight of the snow above it. It is therefore easy for a man to slip through an apparently safe-looking spot into a natural bath containing quite hot water. Mr. Bennett informs me also that this steaming process forms a huge honeycomb beneath the glacial surface. In many places along the shores of Deception Island the water is quite hot and steam is seen to rise.

Bagshawe and I landed on the east side of Whalers Bay and made off in the direction of Pendulum Cove. We did not reach this place through lack of time, but will give an account of our journey as far as we went.

When landed, we first of all had to walk over 1000 yards or so of putrifying whale meat and the bleached bones of thousands of whales long since dead, which litter the shores wherever whaling operations are carried out. After a short walk over some snow which still remained from the winter, and passing the magistrate's hut, we approached the small and perfectly round crater which lies just to the north of the whaling station. It is a tidal pond, and on measurement we found it to be about 900 feet in diameter. The crater, which is on the sea-level, has a cinder bank round it which is of an average height of about 8 feet. From this crater we proceeded along the beach until further progress was barred on account of the very steep glacier foot running from inland down to the water's edge in Port Foster, and for the most part having an overhanging icefoot. We therefore altered our direction inland, and commenced some very hard up-and-down climbing. I do not think that we went more than 4 miles as the crow flies, but progress was so difficult that it seemed much more like 24 miles. Scattered over the rocks were many nests, and in most of them eggs belonging perhaps to Black-backed gulls and Terns could be found.

At first our travelling was over huge rocks interspersed with cinder, but soon the ground changed and hardly any more rock was visible ; nothing but huge piles of cinders everywhere. Enormous masses of lava and what I understand are termed volcanic bombs were scattered all over the place.

We scrambled from the crest of one pile to the crest of another for hours, and between each mound we descended into " troughs." When we stood on a high mound of cinders, we could see nothing but these huge piles of cinder and volcanic matter everywhere, up and down in all directions. There was not a sound or trace of life. On different levels and in the troughs between the mounds we found many very clear water pools, ranging in size from 2 or 3 feet to 200 or 300 feet across ; most of them had a thin coating of ice.

At first we trod on cinders alone, but later, when we paused to look back, we observed long scores of glistening ice cut out by the heels of our boots and only 3 or 4 inches beneath the cinders. This proved to us that we had reached the beginning of what I think is termed the "fossilized glacier."

Soon several small crevasses began to half expose themselves. In one of the hollows we were arrested by a peculiar noise, which although quite close was most difficult to locate. Eventually we found a small crevasse close by and upon approaching it and looking inside the noise was explained: the glacier was apparently hollowed out at that spot, and the sound we heard was produced by a subterranean stream. We proceeded on our journey, which still consisted of climbing up and sliding down these heaps of cinders; and at the top of every pile more piles appeared, whilst everywhere only a few inches of cinder separated us from the bare glacier surface beneath.

It is difficult to think how this deposit became superimposed on the tops of these glacial pinnacles. If it had only been small cinder the wind would have accounted for the phenomenon, but I feel certain that no wind could have moved some of the conglomerated masses of cinder that we saw resting on the ice. Volcanic eruptions, it would seem, must have taken place since the formation of the glacier.

Sheer cliffs of glacier could be seen here and there where ash deposit could not rest. In some places the cinders rested on the glacier more than a foot in depth. From what we could see, the land on the other side of Port Foster and on the inside rim of the island appeared to be quite similar in structure to the side we were on. Beyond volcanic remains, there appears to be little else of geological interest after a mile or so from the whaling station. I do not remember to have seen any steam issue from the ground when in the hills, and many of the small water pools resting in the hollows were tested with our fingers and found to be quite cold. A certain amount of minute insect-life exists on the slopes of the mountains in the vicinity of Whalers Bay.

During our stay at Deception Island, previous to our landing, and again at Nansen Island after our relief a year later, when we spent several months with the whaling people, information was gathered on a very little-known and very interesting industry.

It was not until the year 1892—*i.e.* one hundred and seventeen years after the first report of whales by Cook—that a pioneer expedition consisting of four ships set out from Dundee at the same time that a Norwegian enterprise under the command of Captain C. A. Larsen left Norway. Unfortunately, wrong equipment for the type of whales met with led to failure. Later, and after the return of the British fleet, attempts were made to raise another expedition, but the collapse of the first venture led, it would appear, to no further enthusiasm, and the matter dropped.

In 1902 Captain Larsen sailed as master of the ship *Antarctic*, under Doctor Otto Nordenskjöld. The disaster which overtook this vessel led to the rescue of its crew by the Argentine ship *Uruguay*. Much discussion on this matter led to the subject of whales, and indirectly sufficient interest was aroused to cause the Argentines to form a whaling company, which commenced its first season at South Georgia in December 1904.

It was however left for the Norwegians, to whom we may say that whaling is second nature, to introduce modern steam methods. In 1905 Mr. Alexander Lange, the present part-owner of the *Svend-Foyn I.*, a modern floating whale factory, formed the basis of the most valuable industry of the South Shetlands.

The whole of the whaling activities of to-day which are conducted in the South Shetlands and the Belgica Strait, with the exception of the firm of Messrs. Salvesen of Leith, which owns the factory *Nekko*, are controlled by Norwegian companies.

The area within which the whaling is carried out (see Admiralty Chart No. 3205) includes, generally speaking, the whole of the Bransfield Strait contained between the meridians passing through Smith and Bridgman islands; also within the De Gerlache or Belgica Strait, *i.e.* from just to the southward of Intercurrence Island to as far south as the Bismarck Strait—lat. 65° S. Occasionally, when whales are scarce within this latter area, the whale catchers will proceed to the seaward of the Palmer Archipelago, but this is not a common practice, as the distance makes the towing back of the carcasses a long and unprofitable business.

The modern whaler is not familiar with the Weddell Sea side of Graham Land, and whaling possibilities to the south of the Antarctic Strait are almost unknown to him.

The days when exploration was combined with commerce have made way for the keen business competition of the twentieth century, when the modern whaler, in order to keep on a footing with rival companies, must devote his entire attention to the chase and leave the work of extending the whaling area to others. This is perhaps one of the reasons why, in late years, the industry has become somewhat congested.

In order to take full advantage of the Antarctic summer, the factories must be ready to leave Norway by the third week in September. Great activity is therefore seen about this time in the Norwegian ports of Sandefjord and Larvik.

From Norway their first port of call is usually Cardiff, where the ships are bunkered to the extent of some 4000 tons of coal. Leaving England, their next destination (sometimes *viâ* St. Vincent–Cape Verde Islands) is Montevideo, where their stock of fuel is finally replenished. It is at this port that the whale-catchers are taken over by the factories. Each floating factory is entitled by the laws governing the whaling industry to have three catchers. These vessels are about 112 feet long and are

fitted with powerful engines from which an average speed of about 12 knots can be obtained. They are left at the end of every season at Montevideo in charge of a man representing the company to which they belong, under whose supervision repairs are carried out and the vessel made completely ready for sea by the time the parent ship returns. Whilst the factory is coaling and provisioning, the three crews of the catchers, numbering thirty in all, are taken over to their respective vessels, which immediately leave the wharf and go alongside the factory lying in the stream; whale-line, harpoon gear, and provisions are then put on board each vessel. No time is lost, and as soon as the factory has finished coaling she proceeds with her small convoy of three ships towards the Falkland Islands, the next port of call. At the capital—Port Stanley—formalities are gone through in connection with whaling licences, and after the invariable supply of fresh mutton has been put on board, they are away again on the southerly course for the South Shetlands and Deception Island. This island lies on the south side of the Shetland group, and it can be approached by several routes, the three principal ones being (i) *viâ* Smith Island, (ii) *viâ* Bridgman Island, (iii) *viâ* the Nelson Strait. The latter way is preferred, as it shortens the journey considerably and the entrance to the strait is easy to recognize. The weather conditions, and especially the position of the ice, decide the route that must be taken. It is quite impossible to say what sort of ice conditions will be encountered, as they vary so very much from year to year. In 1919 ice was sighted 200 miles north of the South Shetlands, but a year later and at about the same date, beyond a few icebergs and a little scattered brash ice, the water was perfectly clear all the way to Deception *viâ* the Nelson Strait. The whaling captains do not like to see a total absence of ice, as they say it denotes a scarcity of whales, and the blue whale which predominates in the first part of the season is reported to be usually found in the vicinity of ice.

Having arrived at Deception Island, usually about the third week in November, work is immediately begun, and so well organized is the whole system that if whales are seen on the fleet's arrival south, it is not exaggeration to say that flencing and boiling operations are commenced almost before the vessel is finally moored.

Good anchorage and a supply of fresh water are the two main requirements of the whaler. There are south at the present day two principal bases where the above can be found, namely, Deception and Nansen islands, but in addition to these places there are many small and good harbours hidden away in this apparently inhospitable region, and every captain has his own special retreat in which to carry out his work.

On first coming south most of the factories usually repair to Deception, although one or two may go to Admiralty Bay in King George Island, if it is free from ice.

At least three reasons keep the factories north of the Bransfield Strait

in the beginning of the season: (i) whales are more plentiful to the northward at this time; (ii) ice conditions are still very bad to the south; (iii) the glaciers have not yet begun to pour forth their summer streams of fresh water. All the catchers being north the hunting is somewhat congested, and the general desire amongst the whalers is to separate to the southward as soon as conditions will allow, and so enlarge the area of the chase. Shortly after Christmas the whale catchers proceed south whilst out hunting for whales and explore the ice conditions in the entrance to the De Gerlache Strait, and as soon as a favourable report is brought back to the factories to the effect that navigation is possible and that whales are numerous, rapid preparations are made for repairing to their southern bases, viz. Nansen Island, Port Lockroy, Sandefjord Harbour, and many other places. They usually remain at these harbours until they have a full cargo or until the end of the season, *i.e.* April 12, when the insurance against ice risks expires.

A magistrate representing the Government of the Falkland Islands, usually Mr. A. G. Bennett (before mentioned), proceeds south with the factories every season in order to protect British interests in connection with whaling.

To navigate in these regions is, of course, a very different matter to navigating in the civilized parts of the globe, where lighthouses and definite landmarks are numerous and their positions reliable. In the south there are few good and easily recognizable promontories; the ice and snow robs every feature of its true shape and distance, and it will be found that a slight alteration in the bearing of any point will alter the whole aspect of what appeared to be a definite landmark. Practically speaking, the only method of navigating is by becoming familiar with the very many and variously shaped "rock exposures." These patches of rock stand out very plainly from the white background, and are caused by the rock surface being too precipitous to retain the snow and are therefore always kept wind-swept and bare.

The Norwegian whaling people, particularly the captain-gunners of the whale catchers, have, after many years of experience, become very familiar with the whole of the coast-line and islands included within the whaling areas, and their information is all the more remarkable because it is unrecorded, there being no properly surveyed chart which shows in detail the knowledge they possess. They do not navigate by sun or star, and the actual position of any point of land is immaterial to the gunners, since their position at any moment is found by the relative bearing of one known object with another, and the course and distance to any place from this position is based on experience.

In a general way the latest Admiralty chart, supplemented with the surveys of the Nordenskjöld and Charcot expeditions, is a vast improvement upon former charts, although in a matter of detail, and in many instances of important detail, there is room for improvement; and it

becomes obvious, after the most limited experience in these waters, that another and entire survey is essential.

Captain Johannessen of the factory *Orn II.* (late *Bombay*) has inserted numerous alterations on an Admiralty publication of an earlier date than the one above mentioned, and this supplemented chart is considered by the whaling captains to be the most reliable for navigation. The alterations contained within it are, however, based on compass bearings and "run by log," and in whatever measure the newly allotted positions of coast-line, islands, and rocks may prove to be correct, it is difficult, as Captain Johannessen himself has already impressed on me, especially when the uncertain influences affecting this means of charting is taken into consideration, to say that the amended chart is correct. No detailed chart corrections obtained by other than scientific means can very well be accepted unless provisionally. Beyond doubt many things are quite wrong, but they must be proved to be wrong; hence all the more reason that another complete survey be carried out in this most important part of the Antarctic.

The currents all set northerly and easterly; it can safely be said that in no place do they exceed 2 knots, and usually only average from about ½ to 1 knot.

The Government report on the Dependencies of the Falkland Islands gives an accurate account, as far as it is possible, of things in general as they are found in this part of the world. There is a commendable desire that the British should again take up whaling as an industry. To the south of the South Shetlands there is beyond doubt a vast area containing numerous hunting-grounds plentifully supplied with whales, but it still remains for these grounds to be properly located and for bases to be discovered before any practical gain from a British standpoint can be made.

An up-to-date survey is almost more important than the subject of whales, since the latter's interests depends entirely upon the success of the former. If the British went south to-day they would not only find the comparatively few known bases already filled with Norwegian ships, but they would in a general sense find themselves totally unfamiliar with this insufficiently charted region. The Norwegian whaler carries the map of this part within his head, and what he has gathered from years and years of experience is sufficient for himself, but inadequate to share with others.

Considering an expedition for pure survey, the following idea has, I think, the advantage of being practical and economical. I have said "pure survey," because the type of vessel suggested would not allow of a very large staff, and consequently all other researches would have to be sacrificed. The vessel would be just the ordinary whale catcher, of which two could be chartered. There are at Montevideo every year, and during the whaling season, several of these catchers lying idle. To equip these

ships for their prospective work would be easy and would cost little compared with the vessels suggested in the Government report. There would be ample room for the necessary staff and equipment, and the question of sheathing the vessel's plates and making her into a " heavy ice ship " could be disregarded since, where the whale catcher can go without damage, the survey vessel could do likewise; besides, the ice conditions in the summer months and in the region where the work would be carried out, are not sufficiently bad to warrant such protection; unless it was proposed to proceed south of the Antarctic Strait during the first season, where it is possible that heavy ice might be encountered.

At the end of nearly every season, at least one or two and perhaps all the factories have a surplus of coal over and above the amount required to take them back to Montevideo; this extra supply is often put on shore as an emergency stock. It is only when the whales have been very scarce and long journeys have to be made in order to capture any at all, and when the season is therefore prolonged, that there is any risk of running short of coal before a full cargo has been taken. It seems quite feasible that by a pre-arranged agreement with the several firms, sufficient coal could be supplied to either one or two survey vessels. Assuming that eight factories supply two extra catchers with a season's supply of fuel, and that the work of these vessels would only entail half the consumption of coal of those engaged in whaling (since the latter would always be steaming in all kinds of weather, whilst the former would spend a lot of their time at anchor), it would mean that each factory would not have more than an additional one-eighth of a whaler to supply per season. Similar arrangements could easily be arrived at with regard to food. A pram and a motor boat of the type used by the Norwegians for short journeys over shallow ground are indispensable.

THE HIGH TATRA IN 1878 AND 1922

J. H. Reynolds

IN the old maps of Europe, at the most northern point of Hungary due south of Cracow, there was a notch like a missing tooth in the even curve of the boundary with Austria. This notch, which may still be seen slightly altered in shape in the new maps on the boundary, not between Austria and Hungary but between Poland and Czecho-slovakia, marks the position of that remarkable ridge of mountains known as the High Tatra, which stand forward a little southward of the main line of the Carpathian system, the geographical cause of the political and racial boundary aforesaid. It has been suggested that the Carpathians are a fiction of geographers. There is indeed no unbroken wall of vast mountains comparable to the Alps or Pyrenees, but rather

a "vallum," more or less continuous, of gently rising hills wooded to their summits, which however do form a very notable termination and contrast to the wide plains of Poland on the north. In this long line of the Carpathian hill-system, the High Tatra suddenly rise into a short length of real mountain wall, far overtopping every neighbouring elevation. The nearest heights, the Low Tatra to the south and the East and West Beskids to the north-east and north-west, are thousands of feet lower. More than 300 miles to the south-east the Transylvanian Alps just fail to attain an equivalent height; and about the same distance to the south-west the Dachstein is the first of the Alpine summits to surpass the High Tatra. To the north, of course, there is nothing to beat; even far-distant Scandinavia does not rise so high.

This group, then, stands pre-eminent among its neighbours at the very centre of Europe, on long. 20° E. and not far south of lat. 50° N., practically equidistant from the Baltic and the Adriatic and also from the North and the Black Seas. It only partially forms the main watershed between the Vistula and Danube basins, because, although on the south-west flank the Váh (Waag) runs to the Danube, on the south-east the Poprad (Popper) turns northward and cuts through a gorge in the East Beskids to join the Vistula. However, in the same plain as the Poprad are streams that reach the Danube *viâ* the Tisa (Theiss).

A careful definition of the position of the High Tatra is made necessary by the fact that this is a region singularly unknown to people of this country. Very little has been written in English on the subject, which is entirely absent from the pages of the *Geographical Journal*. This very year, however, there has appeared, or rather reappeared, an excellent account by no less an authority than Viscount Bryce, about a hundred pages of his 'Memories of Travel' being devoted to his journey in 1878, which, he tells us, he recorded in the *Cornhill Magazine* at the time. Conditions of travel have naturally altered considerably since his visit. He and his companion, Leslie Stephen, approached the Tatra from Cracow by a tedious ride in a rustic waggon to Zakopane, having sent their baggage round to the south side by train *viâ* Oderberg (Czech: Bohumín). Now there is a railway from Cracow to Nowy Targ and Zakopane, and a transfrontier line from Nowy Targ through the western hills *viâ* Suchá Hora to Kral'ovany. Modern Zakopane, with its villas, cafés, and boarding-houses, evidently did not exist in 1878, the name Zakopane being used by Lord Bryce for a collection of hamlets, the principal of which was the old ironworks village, boasting the possession of a primitive inn. His description of Zakopane, therefore, does not apply to-day.

It is surprising that, while Lord Bryce remarks upon the good looks of the Poles of the mountains, he does not call special attention to the remarkable local costume at Zakopane. The men and boys in this respect are more striking than the women. Almost without exception

they wear the sleeveless sheepskin jacket with the fleece inside and the dark brown outer surface prettily embroidered. The tight-fitting trousers are made of a cream-coloured felt, generally with a black or dark blue stripe up the side and always with a red rosette at the ankle, while the upper parts of the thighs are most elaborately embroidered, generally in red and blue. The men wear a round black hat with a coloured cord round the crown, and often carry a stick having a little axe, probably by way of ornament, for a handle. The women also sometimes wear the sheepskin jacket; all have gaily patterned skirts and particularly affect a scarf of yellow, with which they cover their heads and shoulders. On Sunday the people are especially smart, and the men appear in spotless white shirts and their best trousers; but on weekdays it must be admitted that some of these garments are but the ghosts of their original selves.

On the south side of the range, Lord Bryce would have found the resort of Smokovec (Schmecks) grown out of all knowledge. The large hotels at Tatranská Lomnica (Tatra Lomnitz) and the Štrbské Pleso (Csorber See) are comparatively recent erections. These three places are now connected by an excellent road, formerly called the Klotildenweg and the Mariatheresienweg but now the Path of Liberty (Cesta Slobody), and by a convenient electric tramway.

But the greatest change of all, and that of course of very recent date, is that the native Slavs, Poles on the north and Slovaks on the south, have come into their own. The Hungarians no longer prevail on the south side. On the railway the Magyar names of the stations have been obliterated and the Slovak versions superimposed. The Czechoslovak Touring Club has taken the place of the Hungarian Karpathen Verein; and, curiously enough, there is even a Czech Major in this district who may be said to take the place of Lord Bryce's Major. The difficulty of nomenclature has enormously increased. Where Lord Bryce and Baedeker are concerned with the German and Magyar names, the new maps give only the Slovak names in Czechoslovak territory and Polish names in Poland. It seems reasonable that the Slav names should come into general use; the district is so little known to Englishmen that the German names can hardly be said to have become conventional, while the Magyar names, for the most part utterly different, may conveniently be forgotten. The important points of pronunciation to remember are that, notwithstanding any written accents, the stress is always on the first syllable in Slovak names and on the penultimate in Polish, and that in both languages the letter *c* is equivalent to *ts*. There are, of course, other peculiarities; but these two rules go a long way and render the Slav names at least as easy to pronounce as the German and far easier than the Magyar. Incidentally, both Poles and Slovaks call these mountains *Tatry* (a plural word), not Tátra, which is the Magyar form but has become conventional.

LOOKING WEST FROM SOUTH RIDGE OF LOMNICKÝ ŠTÍT

SATAN (WITH NEW SNOW) FROM EAST

POPRADSKÉ PLESO (LOOKING NORTH-EAST)

LOOKING NORTH-WEST FROM POLSKÝ HREBEŇ

English tourists are still, or have again become, something of a rarity in these parts, as the Visitors Books at the Tourist Huts will testify. At the larger hotels there may be found some one who can speak English; and it is interesting to find here and there a native who has returned from a Slav colony in America either permanently or on holiday to revisit his now liberated country, and who can speak a word or two of English (strongly Americanized). German is understood almost everywhere, while a knowledge of Russian gives useful assistance in the translation of Slovak and Polish notices, etc., but does not render the spoken languages intelligible. It may, however, be understood and spoken by men who have been through the Siberian campaign. Very varied were the experiences of these Slavs in the Great War, some fighting on one side, some on the other, and some on both. It remains to be said that Slavs of all classes will be found to be delightful people, simple and kindly like all mountain dwellers. Lord Bryce has described the striking contrast between the Slav and the Teuton.

The month of Lord Bryce's visit is not mentioned, but it was probably rather earlier than September. Last September there was a great deal of cloud and much rain, which ultimately turned to snow, so that on the 14th there was a white world above 6000 feet; but the weather was said to be unusually bad for the time of year.

The High Tatra consists of a single granite range flanked at either end by limestone mountains of less height and interest. It would be a convenient form of appellation to call the whole range of 40 miles the Central Carpathians and to reserve the name High Tatra for the granite section, which differs so entirely in character from all neighbouring heights. Lord Bryce says that the granite axis is about 20 miles in length; actually in a straight line from east to west it is little over 12, but the main ridge forks at the west end, the northern prong ending in the Świnnica and the southern in the Kriváň. The extraordinarily abrupt rise from the plain (especially on the south side) and the serrated character of the naked ridges reminded Lord Bryce of the remarkable little group of mountains in the island of Arran. The same likeness struck the writer, but chiefly in respect of the granite structure. An even closer resemblance in general outline is provided by the aspect of the Coolin in Skye, where, however, the rock is black gabbro and not grey granite. A general view of this range from the west is wonderfully like the view of the Tatra from the south. You see, in each case, curving away from you to right and left a single and abrupt mountain chain, broken up into a series of corries divided by spurs terminating in very steep but smooth slopes. These spurs tend to obscure the main ridge behind; you hardly get more than a suspicion of its extremely rugged character. But climb up into one of those corries or on to one of those spurs, and the savage character of the main ridge is revealed. You see before you, in the Coolin and the Tatra alike, a series of great bastions,

LOOKING NORTH-WEST FROM POLSKÝ HREBEŇ

POPRADSKÉ PLESO (LOOKING NORTH-EAST)

linked together by a narrow curtain wall of naked rock of wonderful ruggedness. In mere size the Tatra has the advantage; for whereas the Coolin peaks average some 3000 feet above the surrounding sea, the Tatra rise 5000 or 6000 feet above the plain, with an average of 8500 feet above sea-level. A Tatra ridge is a real knife-edge, or rather a saw-edge, the teeth varying enormously in size. From the peaks fall tremendous precipices—no smoothly cut cliffs such as characterize limestone or sandstone formations, but torn and ragged rock surfaces from which stand out innumerable spires and pinnacles, whose presence is often unsuspected until the clouds wreath themselves among them and show up their fantastic outlines.

High up in the corries are many wild tarns. It is misleading to speak of these as lakes; they vary from an eighth to half a mile in diameter, the largest, as Lord Bryce points out, being no larger than Grasmere. The prevailing colour of these tarns is dark green; several, indeed, bear the name of Green Tarn (Zelené Pleso). Lord Bryce describes them as dark blue; but the writer saw none of this colour, which perhaps they may assume under a cloudless sky. Lord Bryce also speaks of countless small icebergs on the so-called Frozen Tarn (Zamrznuté Pleso); but nothing of the sort was to be seen on this tarn last September. At the foot of the precipices there were many patches of old and dirty snow which had practically become ice; but there are no glaciers in the Tatra for the simple reason that there is nowhere in the upper regions for snow to lie in large masses.

The majority of the tarns lie at a high altitude; but there is one, the Štrbské Pleso (Csorber See), completely in the forest area. This is now a very formal sheet of water, with a large hotel and a small railway station on its bank, but doubtless forms a pretty foreground to the stern range behind in clear weather. And there is one tarn, by far the most beautiful in the Tatra, which Lord Bryce seems to have missed or he would surely have dwelt upon its loveliness. This is the Popradské Pleso (Popper See); and its peculiar charm lies in the fact that it is just below the tree-line and at the same time is closely hemmed in by bare granite mountain sides. The same description applies, more or less, to the so-called Fish Lake on the Polish side; but trees there are scarcer and the mountains still closer and higher. The nomenclature of this tarn and its slightly higher neighbour is confusing. The lower tarn is now always known as the Eye of the Sea, Morskie Oko, not the Fish Lake, Rybi Staw; while the upper tarn, which Lord Bryce knew as the Eye of the Sea, is marked on the new maps as Czarny Staw, a name meaning Black Mere, which is shared by other Polish tarns.

No visitor to the Tatra, at all events to the southern side, can fail to be struck with the different zones of vegetation that are met with. The main line of railway, after passing through beautiful park-like country with short turf at the Váh-Poprad watershed, runs through a rather

bare-looking region, studded with compact little villages, where the land is cultivated in those long narrow strips which Lord Bryce noticed on the Polish side. The three branch lines to the Štrbské Pleso (rack and pinion), Smokovec (electric), and Tatranská Lomnica (normal), climb to the forest zone which is 3 or 4 miles wide. The principal hotels stand in clearings in the forest; there are no proper villages or even scattered cottages to be seen once the plains are left. In the thick growth of firs and pines, it is extremely easy for the stranger to lose direction; and it is as well not to leave the well-made paths—now blazed in different colours. These would have dismayed Lord Bryce, who remarks that in 1878 fortunately white alone was used; but after a long day in the upper regions the homing tourist is only too glad to find and stick to the particular colour which will lead him back to his evening meal and night's lodging. In the forests are areas devastated by sudden hurricanes, when thousands of trees have been laid flat in a few hours. These are brilliant with the mauve-pink willow herb and abounding with wild raspberries—a fact not mentioned by Lord Bryce, at whose visit wild strawberries were very plentiful. The writer also found one large bush of wild red currants. Higher up in the forest grow bilberries in remarkable quantity and quality; and here too in great profusion grows that glorious plant, *Gentiana Asclepiadea*, with its splendid 2 or 3 feet spikes of brilliant blue, rather like the bells of a large wild hyacinth growing in pairs up a Solomon's Seal.

In the forest are roe-deer and wild boars; but bears, lynxes, wolves, and bison are probably becoming scarce, except, perhaps, in the north-east region. Bird-life is extraordinarily absent. Lord Bryce speaks of a "large, loud, handsome woodpecker"; but the writer saw none of this or any other species, except a solitary eagle which soared over one day with its peculiar flap of the wing-tips, and, curiously enough, on the highest point reached, the summit of Rysy, a pair of very tame small birds, which eagerly pecked up the crumbs that were thrown to them.

Above the forest is a narrow zone which looks from below to offer nothing more formidable to the mountain-walker than bilberry or ling, but is found to consist of dwarf pine. "This hateful little tree," as Lord Bryce calls it, grows so close to its fellows that the interwoven mass of stiff little branches provides as impenetrable a barrier as could well be devised without recourse to spikes and prickles. The paths with their coloured markings lead through this obstacle on to the boulder-strewn region at the foot of the great precipices. Here at once the intruder hears the piercing shriek of a marmot; very familiar will he become with this startling sound, and very seldom will he be quick enough to catch a glimpse of the little brown creature that darts away out of sight into the wilderness of boulders. In these uplands may also be seen a solitary badger or a small herd of chamois, often at no great distance. It is a

scene of desolation ; but here too may be found a great variety of flowers, especially the dark blue monk's-hood, growing wherever there is water, even though that water can only be heard trickling below the surface. Small runnels seem to dry up or sink into the stones in the summer ; only the streams from the main corries seem to be permanent and dash down through the forests in foaming cataracts, that are pleasing enough but hardly equal to our best British becks and burns.

Lord Bryce gives a description of his walk across the main range from north to south by the only pass in the central portion, the Polský Hrebeň (Polnischer Kamm). The writer with his companion and a party of Czech officers took this route in the opposite direction as far as the Morskie Oko, whence a motor-charabanc now runs to Zakopane. A broad path winds up from the electric tramway at Polianka (Weszterheim) through the forest high up above a foaming torrent. Here the Czechs kept a keen look-out for the large edible fungus that figures so plentifully in the local dishes. Clean and fairly comfortable quarters for the night are to be found at the Tourist Hut called the Sliezský Dom (Schlesierhaus) that stands by a little tarn under the great cliff of the Gerlach (Gerlsdorfer Spitze), the highest of the Tatra (8737 feet). It is as well to make an early start next morning in order to cross the ridge before the clouds roll up from the southern plains. There is no difficulty about the ascent in summer, though a few chains are fixed near the top ; however, a simple memorial on the rock records a fatal accident near here. This part of the main ridge does not form the frontier between Czechoslovakia and Poland, and it seems as if Lord Bryce was under a misapprehension when he spoke of it as being in those days the boundary between Hungary and Austria. The frontier is not crossed till some miles further north-west on a low spur in the forest zone, where an avenue has been cleared and a boundary stone still bears the letters M. O. for Magyar Orszag (Hungary).

Very striking is the view north-westwards from the Polský Hrebeň, with a graceful little peak filling up the valley in the foreground. Down to the Frozen Lake (Zamrznuté Pleso) it is a long scree-run, the " steep and rugged path " up which Lord Bryce toiled in 1878. Then follows a stony waste inhabited by marmots and badgers, while the view of the main range south-westwards opens up splendidly. Another big descent takes you to the bottom of the deep Whitewater Valley (Bielovodská Dolina), eloquently described by Lord Bryce as of wild and wonderful loveliness. The cart-track down this glen is left after a couple of miles by a path which crosses the frontier, on the spur referred to above, into the valley of the Fish Stream (Rybi Potok) flowing from that superb tarn, the Eye of the Sea (Morskie Oko). The origin of this strange name (which he applied to the neighbouring upper tarn) is said by Lord Bryce to be " an odd fancy which the people have that it communicates with the ocean," because " when the air is calm waves rise on its surface, a

GANEK, VYSOKÁ, AND RYSY FROM EAST

GANEK, LOOKING EAST FROM RYSY-VYSOKÁ COL

RYSY-VYSOKÁ COL FROM WEST

VYSOKÁ FROM SOUTH

phenomenon which must be caused by there being at that moment a storm raging in the Atlantic or the Baltic."

After a short stay at Zakopane, interesting on account of the striking local costume described above, the writer's return journey, owing to the severity of the weather, was made by the road which leaves Poland by the bridge over the Bialka 8 miles east of Zakopane, and leads through Javorina and the dense forests, where Prince Hohenlohe had his shooting-box and bears are still to be met with, to Podspady, where there is a big timber yard and an aerial wire-rope line extending miles across country. Hence a well-graded main road leads over the low Ždiar Pass (3545 feet) and down through the straggling but charming Slovak village of Ždiar, where the cottages are like those which Lord Bryce saw in Poland, built of unhewn logs of a rich brown colour, the interstices stuffed with mud and coloured blue, with bright red window-frames and roofs of long wood shingles. Each has its little garden with wattled fence and a group of farm buildings almost as picturesque as the cottages, while the peasant women in gay skirts and shawls (paddling about with bare feet in the appalling mud of the road) add to the charm of the scene. Hereabouts the nose is greeted by that peculiar smell of pulled flax which is so familiar in Ulster. This road leads well to the east even of the eastern limestone extension of the High Tatra, till at Kotlina (Höhlenhain) it is possible to turn south-westward along the foot of the mountains and so to reach Tatranská Lomnica. On this road is passed a sanatorium for consumptives; similar establishments are seen near Zakopane and at Nový Smokovec.

The writer did not emulate Lord Bryce in climbing the Gerlach or the Lomnický Stít (Lomnitzer Spitze), but was contented with the easy but interesting ascent of the Rysy (Meeraugspitze), 8212 feet. This peak stands at the south-eastern angle of the notch in the frontier mentioned above and overlooks the Polish tarn, the Eye of the Sea, and its neighbour, from which a very steep ascent may be made. On the Slovak side, an excellent "blazed" path leads from the Popradské Pleso right to the summit; and this path was actually being remade in most scientific fashion last September by gangs of soldiers who were stationed at the Tourist Hut called the Majláthov Dom on the Popradské Pleso for their spell of mountain training. The path reaches the ridge at a col between Rysy and the great three-headed peak called Vysoká, the High One (8415 feet). Though this holds only fourth place for height in the list of Tatra peaks, the Germans give it the name of Tatra Spitze; and its splendid appearance from all points of view fairly entitles it to rank as the queen of the Tatra, as the higher and more massive Gerlach is the undoubted king.

It remains to be added that this delightful holiday ground, which, by the way, is available for winter sports, can be easily reached either *viâ* Berlin and Breslau, or—a far more interesting route—*viâ* Nürnberg

VYSOKÁ FROM SOUTH

RYSY-VYSOKÁ COL FROM WEST

and Prague. Two nights must be spent in the train, but these may be separated by a night each at Nürnberg and Prague. The two routes meet at the big junction of Bohumín (Oderberg) in Czech Silesia close to the German and Polish frontiers. For the Polish side of the range only, or in other words for Zakopane, the best route would be *viâ* Berlin, Breslau, and Cracow, or, avoiding Germany, by sea to Danzig and thence by train through Warsaw and Cracow.

A NOTE ON THE MAP ILLUSTRATING THE JOURNEY OF THE PERCY SLADEN EXPEDITION, 1922, IN NORTH-WESTERN YUNNAN

Prof. J. W. Gregory, F.R.S., and C. J. Gregory, B.Sc.

(*The Map follows p.* 240.)

THE most striking feature of the country included in this map is the trend of the river valleys across it on lines generally from north to south or from north-north-west to south-south-east. The main valleys are deep steep-sided trenches ; each of them is incised in a broad shallow higher-level valley ; the floors of these upper valleys rise to a still higher widespread land surface, which in comparison with the general relief of the country is gently undulating. This surface is now being destroyed by the growth of the tributary valleys ; but sufficient of it is left to show by the general regularity in level and the steady rise to the north that it is the remains of an old plateau, which sloped downward to the south from the higher mountains of south-eastern Tibet. The highest mountains in this region are the Great Snow Mountains or Ta-shueh Shan east of Batang, which apparently rise to over 25,000 feet. They are a little to the north of the border of the map ; within it the highest mountain is probably Kagarpo to the west of Atuntze. According to our observations the highest peak on that range is not less than 24,000 feet above sea-level. We unfortunately failed to confirm this height by trigonometrical observation, for the mountain was always under cloud when the theodolite was available.

The arrangement of the major valleys resembles that of fiord valleys. The map indicates the parallelism of their steep walls and their regular angular branching.

During our journey a rough prismatic compass traverse was carried out, mostly by one of us (C. J. G.), who plotted our route on to a sketch-map, combined with data from the maps included in the accompanying list of authorities. He also observed the latitudes at three points marked on the map by a 5-inch vernier theodolite recording to twenty seconds which had been lent us by the Royal Geographical Society. These observations unfortunately could not be made more often, as our march

was during the rainy season. The nights were generally cloudy, and the attempts to obtain latitudes at various places where they would have been very useful were frustrated by the weather.

Our sketch-map has served as the basis for the accompanying map, which has been prepared at the Royal Geographical Society, under the supervision of Mr. Reeves. Mr. Reeves has added the results of Mr. Kingdon Ward's latest latitude observations, and those by Mr. E. C. Young. Mr. Reeves has made especially important additions along the valley of the Salween. He remarks in a note that "In its valley, between Latsa, close to Polati, of which Mr. Kingdon Ward had found the latitude to be 27° 29′, and Lanchiati, which Mr. E. C. Young's latitude observation places in 26° 29′ 30″, the river is shown as entirely unmapped. These observations make the unexplored section about 15 miles longer than previous maps show it.

"Somewhere in this section the two German explorers, Dr. Robert Brunhuber and Carl Schmitz, were murdered early in the year 1909. Mr. A. Rose, who investigated the circumstances of the murder, made a sketch-map of their supposed route, which was published in the *Geographical Journal* for December 1909; but as this map was merely from information supplied by natives, and has since proved to be wrong as to distances and the position of places, it has been considered advisable to reject it; nevertheless one or two of the places shown are given approximately on the map, as there appear to be other reasons for supposing that they do exist somewhere near the positions in which they are shown. Except for the small part of Burma on the west of the map covered by the Survey of India sheets, and the telegraphically determined positions of Tengyueh, Yungchang, and Tali, the longitudes throughout the map depend upon traverses; such attempts at astronomical determinations as have been made were considered too unreliable for acceptance."

To the north-western part of the map Mr. Reeves has added the hitherto unpublished results of Mr. Kingdon Ward's journey, with his latitude observations.

With few exceptions, where they are taken from other sources, the heights along the route are based upon a series of boiling-point observations, most of which were made by means of two Casella boiling-point thermometers, corrected by National Physical Laboratory certificates. We had with us four other boiling-point thermometers, two of which had been lent us by the R.G.S. Only two were as a rule used, and those less frequently than we had intended, for fear of accident. Our best air temperature thermometer was broken on the first time of using it. This misfortune made us unduly nervous about our boiling-point thermometers, for it was essential to have them on the northern part of our journey. Our boiling-point stations were therefore limited in number, and for the intermediate positions we trusted

to two aneroids, by Cary, lent us by the Society, and one by Casella which we found especially reliable. For readings between Bhamo and Tengyueh we used a Short & Mason aneroid, which was serviceable only to 6000 feet. It was therefore left behind at Tengyueh and used again on our return.

Our calculations in the field of altitudes from the boiling-point observations gave results from 700 to 1000 feet lower than those previously accepted. Altitudes determined by this method are of course dependent on a factor representing the air temperature between the place of observation and the base of reference. In dealing with such great heights as those in Yunnan a slight difference in the assumed air temperature may make a difference of hundreds of feet. We could only make our Atuntze altitude agree with those accepted by assuming air temperatures which seemed improbable. Our observations were therefore referred to Mr. Reeves, who has kindly worked out the results, taking Tengyueh (5365 feet above sea-level) as the datum. For the barometer and thermometer readings taken there during our journey we are indebted—as for much else—to the kindness of Mr. J. H. W. Houston. As a check on these results Mr. Reeves also calculated the boiling-point heights directly from sea-level by taking the monthly sea-level readings from Buchan's Charts, issued in the *Scientific Results of the Challenger Expedition* ("Physics and Chemistry," vol. ii.). The agreement between the two is remarkably satisfactory, the differences ranging only from 8 to 58 feet. Mr. Reeves' calculations give the following results for the boiling-point stations:

Locality.	Altitude computed from		Height accepted (round numbers).
	Difference from Tengyueh.	Sea-Level from Buchan's maps.	
	Feet.	Feet.	Feet.
Luchang village, on the Mekong	4,345	—	4,350
Weisi (inn in lower E. part of town)... ...	7,380	7,438	7,400
Oshia, N. of Weisi	6,237	—	6,200
Si La: pass W. of Tsedrong...	13,968	13,987	14,000
Shentse La (Pass at N. foot of Mt. Francis Garnier)	12,864	12,822	12,900
Mekong river, village opposite Yangtsa. About 150 feet above the river	6,621	—	6,600
Jensa La	16,810	16,756	16,800
Atuntze	10,827	10,818	10,800
Shalu	9,206	—	9,200
Jugo Shan; Pass	11,980	12,028	12,000
Hoking	4776	—	4,800
Yungchang	5,410	5,418	5,400
Lunch-place W. of Salween Bridge (700 feet above river)	2,849	—	2,900

These heights are marked on the map with the initial B. For the intervening altitudes we have trusted to aneroid observations, adjusted to the boiling-point results.

The chief authorities used in the compilation of the map are as follows:

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MAJOR-GENERAL H. R. DAVIES, "Map of Yün-nan," scale 1/1,267,200, War Office, 1908; and in his 'Yun-nan, the Link between India and the Yangtze.' 1909.

JACQUES BACOT, 'La Tibet Révolté. Paris, 1912.

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"North-eastern Frontier," Survey of India. Scale 1/253,440. 1902–1906.

"India and Adjacent Countries." Survey of India. Scale 1/1,000,000. 1914.

"Map of the N.E. Frontier." General Staff, India. Scale 1/506,880. 1914.

A SIXTH ATTEMPT ON MOUNT KENYA

Dr. J. W. Arthur

DURING the month of February I made my sixth attempt to reach the summit of this great mountain. My previous attempts were made in 1909, 1915, 1919, 1920, and 1921. All but one were made in February or March, that one being in August.

Great hopes had been set on this last expedition, which was to set the seal upon our ambition to reach the summit. The reason for these hopes was that great preparations had been made for about a year previously. Chogoria, one of the Scottish Mission sites on the east side of the mountain in the Mwimbi country, was to be made the jumping-off place for the expedition. It could be reached in a good day's journey by motor car from Nairobi; it is in the heart of a thickly populated native area.

In April of last year two rest huts had been put together in Nairobi to a design approved by Mr. Melhuish and myself. To the keenness and generosity of Mr. Ernest Carr of Nairobi, who made possible the building of these huts and all the expense of their cartage out on to the mountain, the grateful thanks of all keen mountaineers is due. Further, although he is fifty-four years of age, his energy and push saw the thing through almost to completion, while he himself was able to reach as high as any of us.

The huts were made in sections, the wall sections weighing 75 lbs. and the floor 150 lbs. each. The roofing was ceiling boards with rub-

beroid over them. These huts were taken to Chogoria, 150 miles from Nairobi, by bullock waggons. Mr. Carr made a preliminary reconnaissance through the forest, surveying and cutting a good path right up to the open land beyond. In September the first serious work was undertaken, when rest hut No. 1 was conveyed by porters to a height of almost 10,000 feet, where it was put together beside the rock bridge across one of the Nithi tributaries. The other hut was also conveyed to this spot ready for the next move. In all this work Mr. Carr was much helped by Mr. Hillier, the Assistant District Commissioner in that country.

I had made an expedition with Messrs. Barlow and Dennis in 1915 from this side, and knew the general topography of the mountain. I was unable, however, to go out myself to direct operations, and endeavoured to instruct Mr. Carr to find the Hobley valley which was to be his first objective. To get to the head of this would mean a 1500-feet rise to the Curling Pond beside the Lewis Glacier. Mr. Carr unfortunately had rather bad luck in not being able to locate this valley, although he made three expeditions to do so. We had hoped the second rest hut would be erected on the Curling Pond at 15,000 feet before the climbing party actually arrived on the scene. Instead, it was found later on our arrival that many of the sections had been carried on to the summit of a ridge of crags, from which there was no ascent to the main peak, and from which they had to be taken down almost to their starting-point.

February had been chosen as the month of ascent, it being the most favourable month in the year for such work, as the weather generally is then fine. Mr. Melhuish—who had accompanied me on one of our most fruitful expeditions, that of 1919—and myself arrived at Chogoria on the last day of January, where we joined Mr. Carr and Mr. Hillier. We were informed that three hundred porters awaited us at the first rest hut, and we set out the following morning on our expedition full of hope : all day as we had travelled out we had seen the snows of Kenya, a hopeful sign of good weather.

We reached the rest hut that evening, and our preparations were made for an early start. Next morning we set off with our three hundred porters and marched 6 miles to the Ruguti Camp, where lay the sections of hut No. 2. On the way we crossed the great Nithi valley up which we had gone in 1915 ; we however did not think it possible to get the sections up that way to the Curling Pond. We were therefore striking into unknown territory. The Ruguti river rises in loud bubbling springs strongly tasting of soda ; here there might be formed later a health camp at 11,800 feet.

At this point were collected not only the hut sections still left, but tents and equipment, food boxes for Europeans, and loads of mealie meal for the porters. From here we set off all laden up, and chose one

of two routes that already had been surveyed by Mr. Carr as being the more likely one. This unfortunately proved to be the wrong one and eventually landed us among crags from which there was no possible ascent or descent forward. Mr. Melhuish and myself went on to survey, and as we went the hills were soon obscured in mist and we had to shelter for two hours during a snow-hail storm. When it cleared a little, we went on so as to, if possible, locate our whereabouts ; Mr. Carr, owing to the weather conditions, retraced his steps with the porters to the rest hut, the sections being left scattered on the sides of the valleys. It took us till 5 o'clock to get to 15,000 feet, when the mist cleared sufficiently to enable us to see where we were. We got back to camp at nine that night, dog tired and rather depressed. Our porters were only signed on for eight days and five already had gone ; practically only one day was left, as two more were required to take them home.

It was decided, therefore, that we would have to give up the erection of the second hut and push on with tents. Mr. Melhuish and I rested ; Mr. Hillier had to return to his duties ; and Mr. Carr occupied the last day by taking all the porters up and gathering the scattered sections and bringing them together at the Ruguti camp, ready some time later to be taken forward.

Next day we paid off the porters and were left with about fifty. With them we again set off, and after reaching the Ruguti camp we took the lower route across the ridges ; we again had rain and snow in the afternoon. We camped that night at about 10,000 feet, and next morning followed the trail marked out with staked bamboos. By eleven we crossed a ridge well up and then descended into a deep valley. From the ridge we saw what was obviously the entrance to the Hobley valley. If Mr. Carr three weeks before had only been able to find this, the hut would ere this have been erected and our expedition would have been able to have started well.

Descending 1000 feet into this valley, we then crossed it and ascended into the mouth of the Hobley. A snowstorm stopped us for a while, but after it cleared we were able to get on, and after two hours reached the two Thomson lakes (14,000 feet) at the head of the Hobley, whence in the evening after the mist cleared we saw up a steep scree of 1500 feet the Lewis Glacier where the Curling Pond lies, Point Lenana, and even the peak itself.

Next morning we ascended to the Curling Pond, and almost immediately a snow thunderstorm came on. We quickly erected our tents, sent the porters down to the Hobley, while our boys made a fire of some timber left there by us in 1921. We had a somewhat miserable day.

Next day we had a lovely morning. The Curling Pond was of a respectable size and there was a fine sheet of ice, on which we skated for a while. Mr. Carr and Mr. Melhuish made an expedition and reached 16,300 feet to the gap on the southern arête, from which Mr. Melhuish

got some fine photographs. I looked after the camp and got up firewood and provisions. The two returned at 1 o'clock, as another heavy snowstorm came on.

Next morning we set off for our first real climb. We went up the snow couloir on the main peak, which required steady ice cutting till we reached halfway up and got on to the rocks. Ere this, however, hail and fine snow came on hard, and it was obvious little more could be done that day. We descended, leaving a rope fixed, and got to camp about two.

Next day was even worse, and the storm was on us by 9 o'clock, and the snow continued till four in the afternoon. Mr. Carr, who had been feeling the altitude, had gone down that morning to the lower regions. It was a beastly day and the boys were feeling the cold and damp badly. Our hopes of any success this year were fast ebbing.

That evening it cleared, and we were able to make an expedition to the ridge below Point Lenana. From here we were able to see into the Nithi valley and to make out that the ascent from this valley to where we were was no steeper than from the Thomson Lakes to the Curling Pond and about the same height. We knew that would make a much better route than ours, as there was a very gradual ascent right up from rest hut No. 1 on the north side of the Nithi to within 1500 feet of the Curling Pond, and motor cars would be able to reach that point almost certainly. The last 1500 feet could be ascended only on foot.

Next morning it looked as bad as ever, so there was nothing for it but to descend ; so reluctantly we struck camp. At the Curling Pond, however, we were able to leave a large porters' tent, food for Europeans and porters, firewood, iceaxes, ropes, and other things all ready for the next expedition. Again, at the Lakes Camp we left another tent, food, and some more equipment. At the Ruguti camp, which we reached at two, we saw the sections left together, some more food left in a tent, and everything snug. We had had our usual snowstorm, which became rain as we descended. We got to the rest hut at 4 p.m

Next morning snow fell on the higher ridges between eight and ten, leaving them white, while with us it rained. Clearing at ten, we were able to get back to Chogoria that evening.

In some ways we had been very unsuccessful. We had got no further than on previous expeditions, and we had failed to erect our upper hut. On the other hand, we had everything ready and prepared for its final carrying up and erection, which is now only a matter of time and good weather. Camps and food are ready prepared, and the way known. We had been able to foresee the possibility of a road which would be motorable not only as far as the first rest hut but even right up into the heart of the mountain to about 14,000 feet, only 1500 feet below the Curling Pond. The expense of making such a road would not probably be very great.

Again, we had been able to add to our geographical knowledge of that side of the mountain. We were able to trace the sources of the Ruguti river, not to the Hobley valley as we thought, but to three shorter valleys between the Hobley and the Nithi, one of them with the mineral springs of the Ruguti camp. The river that comes down the Hobley valley was traced through the forest to what we know to be the Thuchi river which forms the boundary of the Chuka and Embu countries. These are two valuable additions to our knowledge of the mountain.

I have just seen the Brochure brought out by the Royal East Africa Automobile Association and entitled 'Winter Sports on the Equator in Kenya Colony.' One admires the energy of the secretary, Mr. Galton Fenzi, and wishes him well in his project to build a road to the mountain. That is quite feasible, I think, and will not be very expensive to make. As to the comparisons with Swiss winter resorts, they are correct in one way but exaggerated in others. The scenery is magnificent and the views on and around and from the Lewis glacier are unsurpassable. Skating will probably often be possible for an hour or so each morning between 6 and 9 a.m. at a temperature of 10° of frost. Ski-ing and tobogganing on the Lewis glacier are quite possible. The mountaineering could not be finer or more difficult anywhere. There is the peak of almost 1000 feet sheer cliff to be negotiated and conquered, a not impossible though difficult and daring feat.

While this is true, certain things will have to be remembered. The motor car could land you not higher than 14,000 feet. Usually mist, rain, or snow will be down on that height by 9 a.m., not to lift till 4 p.m., and often never off the mountain for days on end. 1500 feet of very stiff climbing up a slippery scree at an altitude of over 14,000 feet have to be negotiated ere the projected rest hut on the Curling Pond can be reached. At an altitude of 15,800 feet and over, which is the snow sports' region on Kenya, exertion of any kind is a severe strain and only possible to those who are young and fit.

With the picture of all the loveliness and beauty and sport to be had on that wonderful mountain must be set over against it the picture of its difficulties. I wish best of luck and sport to those who try and dare, but they should be prepared for all the hardship it will entail.

The weather can never be depended on; it will probably be best in January, February, March, or September and October.

AN ASCENT OF MOUNT SEKERR, KENYA COLONY

J. G. Hamilton-Ross, Assistant District Commissioner

THIS peak, 70 miles north-east of Mount Elgon, is the highest point in the Chemorongi Range and the loftiest peak in the Kacheliba district, Kenya Colony. As far as can be ascertained, there is no record of any previous ascent.

Our ascent was made by Mrs. Ross and myself, an askari (native policeman), one porter, and three local Suk natives, on 25 February 1923. We camped overnight on the narrow knife-edge which connects Sekerr with its nearest neighbour to the south, at an altitude of approximately 8600 feet, and left at 6 a.m. next morning, reaching the summit at 9.30 a.m. The vegetation on the lower slopes is thorn-bush of many varieties; higher up are a few trees such as Podocarpus and *Juniperus procera*; then come bamboos between 9300 and 10,000 feet; and then the forest gives place to a matted tangle of undergrowth, giant heath, trailing convolvulus bearing a pinky-mauve flower, leucodendrons of two varieties like those of the Cape Province, South Africa, and many other smaller plants. Higher a small type of *Anemone Capensis* was found.

We were compelled to cut and push our way through the growth, which was more than breast-high, for at least 1000 feet, after which the vegetation thinned and decreased in height. A dry watercourse provided us with something like a pathway. The actual summit is flat and bush-covered. Absolutely no trace whatever of a previous visitor could be found, so after a brief rest and some refreshment we erected a small beacon and deposited our record.

According to aneroid readings made by Mr. V. G. Glenday (Acting District Commissioner), who was unfortunately prevented by lack of time from reaching the summit, the forest ceases at 11,000 feet, and the highest point must exceed 12,000 feet; even after making due allowance for errors of observation, it cannot fall far short of that figure. [On the provisional sheet North A–36/R, G.S.G.S. No. 1764, 1914, the height is given as 10,910 feet, but Mr. Hamilton-Ross was unaware of this; he writes that no map known to him gives any figure for the height.]

The Suk regard Sekerr as a semi-sacred place, and their dead are buried facing it.

The principal animal inhabitants are buffalo and colobus monkeys: we observed several splendid specimens of the latter.

The rocks are mainly hornblende schist, so common in this district.

THE STORY OF THE MAP OF ITALY

L' "Italia" di Giovanni Magini e la Cartografia dell' Italia nei secoli xvi. e xvii.— R. Almagià. (Comitato Geografico Nazionale Italiano, pubblicazione n. 1.) Napoli, Città di Castello; Firenze: Soc. Anon. F. Perrella. 1922. Pp. viii. 183; 9 plates; 355 × 250 mm. (14 × 9¾ inches). *Price* 60 *fr.*

AS Prof. Almagià points out in his preface, "the history of the cartography of Italy [and one might add, of most other countries of the world] from the invention of printing to the middle of the seventeenth century, has yet to be written. That is to say, we have not as yet a comprehensive work, investigating and co-ordinating the successive improvements which have been made in it, whether as regards the whole country or its individual parts, from the appearance of the first printed maps to the beginnings of scientific cartography. And the chief reason why this work of synthesis is lacking is, that the works of analysis on which it must rest are not yet in existence."

Prof. Almagià himself has already, in a series of articles published in various Italian periodicals, studied the early cartography of the different regions of Italy; and the present work required, as he points out, an examination of the whole of the great mass of maps which were produced in Italy during the sixteenth century, in order to determine the sources which were at Magini's disposal, and the use which he made of them.

More will, it is true, have to be done in the study and publication of these sources before the material is placed before the world. Nordenskiöld, in his *Facsimile Atlas*, despite the wide range of his title, was mainly interested in representations of the whole world, and in the various editions of Ptolemy, though he also devoted some attention to a collection more nearly concerning our present subject, namely, the famous atlas of Lafreri, an important copy of which was presented by him to the library of Helsingfors, while another has since been given by Lord Peckover to the library of the Royal Geographical Society. Of this a number of other copies are now known, and more are likely to be found in the various libraries of the world.*

Giovanni Magini was born at Padua in 1555, and became Professor of Astronomy at Bologna in 1588, holding the chair until his death in 1617. He published, mostly at Venice, a large number of astronomical works, of which we need not speak; and in 1596 he published an edition of Ptolemy's *Geographia*, which was several times pirated and reprinted. The maps are, however, without original value, being mere copies from Ortelius and others, while a large part of the text is taken from Leandro Alberti's *Descrittione di tutta Italia*. This work therefore had no value as a preparation for the task which he was afterwards to undertake; but it must have shown him how much yet remained to be done to place the cartography of Italy on a satisfactory basis. He had indeed already begun his new labours; and on 15 March 1595 he announced his intention in the dedication to a map of the territory of Bologna: "Inasmuch as I desire to publish a complete atlas of Italy, showing, besides the provinces, the territories of each city, I have decided to publish first this map of the territory of Bologna," etc. This was soon followed by other maps, and in two years he had the greater part of the maps of North Italy already engraved, and some of them published. They were apparently sold separately,

* On Lafreri's Atlas see the important articles by Dr. F. C. Wieder in *Tijdschrift van het Kon. Nederlandsch Aardrijkskundig Genootshap*, 2e Ser. dl. xxxii. (1915), 111 *sqq.* (see also *Geogr. Journal*, vol. 46, p. 68).

and are extremely rare in this state ; * for, being unable to obtain material for his maps of Southern Italy, he started correcting and revising what he had already done, publishing a new map of the territory of Bologna in two sheets in 1599. At last, in 1602, he received materials for the formation of the maps of the kingdom of Naples ; and in 1604 nearly the whole atlas was ready, and an index of it appeared in the Latin edition of his astronomical work, the *Tavole del Primo Mobile*. But now he was unable to obtain engravers, owing to a series of misfortunes, and began a lengthy descriptive commentary which was to accompany the maps, but which was never published, and is for the most part lost. At last, in 1607, he secured the services of one Benjamin Wright, who, in the following year, engraved for him a large map of Italy in six sheets. Wright, however, was something of a drunkard, and pawned several of the plates which he had done : and it was only in 1613 that the engraving of the plates was finished, after a good deal of further revision. The printing at last began in Bologna at the end of 1616 ; but Magini's death delayed the appearance of the work until 1620, when his son Fabio, who was not fifteen when his father died, finally brought it out.† He dedicated it to Ferdinando Gonzaga, a member of the ducal family of Mantua, with which Giovanni had been in close personal relations, and who indeed had procured him a great deal of manuscript material from the governments of the various states of Italy.

The value of their help can hardly be overestimated. The exhaustive examination which Prof. Almagià has undertaken shows that not more than one-fifth of the maps are based on previously published material, while the rest are derived from manuscript maps of an official character, or from new surveys, of which in almost all cases he obtained the exclusive use. Where he was compelled to rely on older maps, he was at great pains to select the best material available. Many of these older maps are of great rarity, though further search is continually revealing the existence of new examples. Prof. Almagià himself describes a number of important maps in *L'Universo*, iv. 5 (May 1923). They are to be found in Holste's copy of Cluver's *Italia Antiqua*, now in the Barberini library at the Vatican (*Stamp.* EEE. vii. 21–25), the existence of which was pointed out to us both by the Vatican authorities.‡ Holste obviously used this copy while on his travels, and made copious marginal notes, which were published after his death by Cardinal Francesco Barberini. § Among the contemporary series of maps which Magini carefully studied—in fact, he spent a whole summer in Rome for the purpose, even though he criticized them

* Two copies of the map of the territory of Bologna are to be found in the Vatican Library, where they were shown me by Mgr. Legrelle, one at the end of a copy of the first (Bonomi's) rare edition of Magini (*Stamp. Barb.*, P. ix. 51), and another among some loose maps which were among the papers of Lukas Holste. On the former, under the words "Territorio Bolognese," the legend "Franco Valegio Form." is inserted.

† He altered the dedications on many of the maps themselves, but otherwise did not in any way alter or revise them.

‡ The map of Sabina (tom. iii. No. 4) is not the only copy known. Cardinal Ehrle (*Le Piante Maggiori di Roma, no. 4 : Roma al tempo di Urbano viii. ; la pianta di Roma Maggi-Maupin-Losi del* 1625, p. 14) had already mentioned this very copy, and adds that there is another in the Gabinetto Nazionale delle Stampe (Corsin. 75, 928). The map is dedicated to Cardinal Benedetto Giustiniani by Giuseppe de Rossi (see *Papers of the British School at Rome*, ix. 139).

§ *Annotationes in Italiam antiquam Cluverii*, etc. (Rome, 1666). A collation has shown me that the Cardinal's work was carefully done.

severely—are those painted by Egnazio Danti in the Galleria Geografica at the Vatican. It is difficult to judge of their original character, for they have been a good deal repainted, both under Urban VIII. in 1631 and under Pius VIII. in 1856.* But Prof. Almagià treats the author of the former restoration as unknown, whereas from a letter of Holste to Peiresc of 4 October 1632 it has long been certain that it was his work.† Even the atlas of Magini is uncommon in its first edition, only six copies having been examined in Italy by Prof. Almagià; but two reprints, one of 1630–2, the other of 1642, are of considerably less rarity. But the large map of Italy was altogether unknown until it was rediscovered by Prof. Almagià, who gives a reduced facsimile of it. It does not contain the results of Magini's most recent work; and it is very likely that he was only prevented by death from including a general map of Italy in the atlas itself.

As to the value of Magini's contribution to modern geography, Prof. Almagià points out that it is considerable. Previous errors both in latitude and longitude are reduced; the political boundaries and physical features are far better indicated than ever before; and a number of names have been added. It was indeed, as he points out, a long time before Magini's work was superseded. He had been unable to secure the Imperial copyright, and a number of pirated reproductions both of the map of Italy and of the regional maps in the Atlas went on appearing until the middle of the eighteenth century, though for the latter the date of their supersession varies considerably with the individual districts.

The reproductions of the map of Italy are most of them, like the original,‡ extremely rare—as, for example, is that which was produced by the German engraver Matteo Greuter, though it was several times reprinted, and though the plates were in existence until 1797.§ The influence of the regional maps on the other hand can be traced in the various atlases, both Italian and foreign, of the seventeenth and eighteenth centuries; and it is only D'Anville's map of Italy, published in 1743, which represents a definite step in advance and marks at the same time the close of pre-geodetic cartography in Italy. It is impossible in this short notice to give an idea of the care and the vastness of detailed knowledge which Prof. Almagià displays, without, be it noted, ever losing sight of his main subject. He is certainly the best historian of Italian cartography, and we may hope for many more works on the subject from his pen.

THOMAS ASHBY.

* Almagià, p. 144. [Some account of these maps (not to be confused with the better known series in the *Logge di Raffaele*) was given by Everhard Schmidt in the *Geogr. Zeitschrift* for 1911 (see *Journal*, vol. 39, p. 498).—ED. *G.J.*]

† *Holstenii epistulæ*, ed. Boissonade, p. 237 (No. xxxix.): "hoc præsertim tempore, dum Summi Pontificis iussu Vaticano ambulacro instaurando laborem molestum sane et ærumnosum impendere cogor." P. 242: "Sed opus adeo negligenter procedit, ut mihi quidem cœpti pœniteat: neque enim tota hac æstate præter duas tabulas, alteram Italiæ novæ, alteram antiquæ, quidquam expedire potui." The whole passage is worth reading.

‡ A parallel case is that of the map of the Campagna Romana of Eufrosino della Volpaia (1547), of which, though it served as the foundation of the cartography of the district for over a century, only a single copy is known.

§ The 1695 edition appears in the catalogue of the De Rossi family at Rome (1700, p. 6), and in that of the Calcografia Camerale (1797, p. 114). Prof. Almagià was unable to find a copy of this edition; but I have seen one in the Topham Library at Eton (in a portfolio in press Bo. 3). [A copy is also in the possession of a Fellow of this Society, Mr. H. Ruffer, who has long been interested in early Italian maps.—ED. *G.J.*]

REVIEWS

EUROPE

Nineteenth Century Europe and Britain.— C. Raymond Beazley. London and Glasgow : Collins' Clear-Type Press. [1922.] 3*s.* 6*d.*

THIS excellent volume, which surveys and, so far as can be done in brief compass, explains the political changes in Europe between the fall of the first French Empire and the close of the recent world war, is one that the geographer ought on no account to neglect. He will, it is true, find it hardly, if at all, possible to trace out any consistent trend of geographical influence in the period, but the successive phases of struggle and settlement cannot but suggest geographical reflections. During the period of about forty years' peace which followed the settlement of Vienna, a period of which the author remarks (p. 49) that "never in human history had there been such a time of advance in social and material well-being," four main tendencies, we are told, may be recognized as in operation, but of these only two, "the progress of the Eastern Question, slowly moving towards the emancipation of the Christians in the Levant," and the colonial development chiefly of Great Britain and France, can be said to have a marked geographical bearing. In the remainder of the period covered by the book it may be contended that the chief influences are in the direction of national reconstruction, first in Italy and Germany (p. 202), and afterwards in the Balkan Peninsula and the lands of the overthrown Austro-Hungarian monarchy. But it cannot be said that this tendency was towards pure nationalism. The only consistent tendency was one displayed by all states that saw their opportunity to increase their power, to seize such opportunity without regard to how that power was to be used, except perhaps as a means of acquiring still more power. All are agreed that the actual result is very disquieting, and we must draw what comfort we can from the hope expressed by the author in his prefatory note that some means may be found "of dispelling some of the fogs of *Darkest Europe*, and suggesting a *Way out*," and for that reason we look forward with eagerness to the further volumes which he gives us reason to expect. G. G. C.

From Berlin to Baghdad and Babylon.— The Rev. J. A. Zahm, C.S.C., LL.D. New York and London : D. Appleton & Co. 1922. $5.00.

The Rev. J. A. Zahm has collected a large number of interesting facts about each town and river that he has passed on his journey. He gives us stories of the Devil on the Danube ; of the crossing of the Bosphorus by Xenophon and Darius ; of the crossing of the Dardanelles by Xerxes, Frederick Barbarossa, and Solyman Pasha ; of great armies under Harun-al-Rashid and Alexander of Macedon marching in clouds of dust through the Cilician Gates. The dingy village of Urfa becomes Edessa as rebuilt by Justinian, surrounded by three hundred monasteries and schools, and crowded with scholars from all over the world. Konia, Tekrit, Baghdad, and the dismal ruins of Babylon come once more to life.

But the book would have been better had the author never left his study, for as soon as he indulges in personal observations he falls into error. He speaks of the Sweet Waters of Asia as bordered by "clumps of balmy pines . . . and beech trees whose pendant branches dip into the crystal stream." Actually the valley is bare. He describes "jauntily attired dragomans" in Constantinople. Whatever dragomans may be in Egypt, in Turkey they are highly respectable members of the Consular Service who wear ordinary clothes. He quotes the proverb "as strong as a Turk," and instances the porters of

Stambul. These porters are nearly all Kurds. He says the Turks are industrious and vegetarian. They are decidedly neither. His Arabic and Turkish are usually incorrect. He writes *Elhanlillall* for *El-hamdu-lillah* and *Geuk Gu* for *Geuk Su*. His chapter on the "home life of the Osmanlis in Anatolia" is out of date and unsound, being based on such authors as Lady Mary Wortley Montague and Pierre Loti. These are but a few of many errors.

E. H. K.

ASIA

The Ins and Outs of Mesopotamia.— Thomas Lyell. London: A. M. Philpot. *7s. 6d. net.*

Mr. Lyell has well utilized the opportunities which his position as Assistant Director of Tapu and District Magistrate gave him of gaining an insight into the character of the Arabs of 'Iraq.

Though sympathetic towards the 'Iraqi, Mr. Lyell is by no means blind to his defects. He gives many interesting and often amusing descriptions of the 'Iraqi's mode of life, his code of honour—or dishonour—and his dislike of the truth; but by way of contrast he also tells, in a vivid and moving manner, how the generally lax and self-indulgent Shia' will, when worked up by religious fervour in the month of Muharram, inflict upon himself terrible flagellations and head-cutting in memory of the martyred Hasan and Hussain.

When he turns to politics and administration, Mr. Lyell pays some well-merited tributes to Sir Arnold Wilson; he shows that 'Iraq is very far from being ripe for self-government, and that the guiding hand of Europeans will be needed for many years to come if the country is to be properly administered and if its vast oil and other resources are to be adequately developed.

Mr. Lyell makes out a strong case against evacuation, and his remarks might be read with advantage by members of Parliament and the leader-writers of our daily papers. On the other hand, his suggested solution—a British protectorate over 'Iraq—would not have been easy at any time, and is of course impossible now.

E. H. K.

The Handbook of Palestine. Edited by **Harry Charles Luke, B.Litt.**, and **Edward Keith-Roach**, with an Introduction by the **Right Hon. Sir Herbert Samuel, G.B.E.** London: Macmillan & Co. Pp. 205. 1922. *One Illustration and a Railway Map of Palestine and Trans-Jordania in pocket at end of the Volume.* *21s. net.*

This volume is a storehouse of concentrated information about Palestine, much of it entirely new and all up to date. It deals with a variety of subjects—geography and history, peoples and religions, places of interest, communications and tourist information, Government activities and natural history. There is no volume of its size which contains one-half of this information, and accuracy has as far as possible been secured in every department by consultation with the best modern authorities on the spot. Probably to many the most novel section will be that which fully describes the activities of the new administration. There has been much criticism of the Mandate for Palestine, and the efforts which are being made to satisfy, within the limits of that declaration, the aspirations of Moslem, Christian, and Jew. No one can study this volume without appreciating the very solid material progress which has been made, and the intelligent and sympathetic way in which the new administration is grappling with the problems which it has to face. But, quite apart from modern political problems, the book is valuable to a wide circle of

readers as a compendium of scientific facts. The railway and road map shows also the boundaries of the new state, the situation of the recent battle-fields, and all the leading archæological and biblical sites. E. W. G. M.

Malaya: The Straits Settlements and the Federated and Unfederated Malay States.— Edited by **R. O. Winstedt, M.A., D.Litt. (Oxon).** London: Constable & Co. 1923. Pp. 280. *Illustrations and Maps.* 12*s. net.*

Burma.— **Sir Herbert White, K.C.I.E.** Cambridge: University Press. 1923. Pp. 226. *Illustrations and Maps.* 8*s.* 6*d. net.*

Into the East: Notes on Burma and Malay.— **Richard Curle.** With a preface by Joseph Conrad. London: Macmillan & Co. 1923. Pp. 224. 10*s.* 6*d. net.*

A Burmese Arcady: An Account of a Long and Intimate Sojourn amongst the Mountain Dwellers of the Burmese Hinterland and of their Engaging Characteristics and Customs.— **Major C. M. Enriquez, F.R.G.S.** London: Seeley, Service & Co. 1923. Pp. 292. *Illustrations and Map.* 21*s. net.*

From Golden Gate to Golden Sun: A Record of Travel, Sport, and Obeservation in Siam and Malaya.— **Hermann Norden, F.R.G.S.** London: Witherby. 1923. Pp. 292. *Illustrations and Map.* 15*s. net.*

Cinnamon and Frangipanni.— **Ashley Gibson.** London: Chapman & Dodd. 1923. Pp. 260. *Illustrations.* 21*s. net.*

The most important of these volumes on Far Eastern lands is Dr. Winstedt's informative work, which is packed with valuable facts about Malaya. Although necessarily compressed, it touches upon almost every aspect of the Peninsula, the thorny subjects of gambling and opium traffic being perhaps the only subjects of which no mention is made. Of the twenty-seven chapters the editor himself contributes sixteen, the remainder being the work of various specialists; this tends inevitably to give the book a lack of cohesion, and it is a matter for regret that Dr. Winstedt did not see fit to produce, instead of a handbook, a standard work on Malaya written by himself alone, a task for which he is eminently qualified. The book contains numerous excellent illustrations, charts, and diagrams, a bibliography, and a good map in colour—the last a pleasant thing to see in these days of expensive production. In a work of this kind a detailed index is essential, and if a future edition is called for Dr. Winstedt would be well advised to enlarge his. At present it is inadequate.

In Sir Herbert White's 'Burma,' a continuation of the series of Provincial Geographies of India of which Sir T. H. Holland is the general editor, the index leaves nothing to be desired, but the map might have been better, and the bibliography, which might have been made a very valuable appendix, is sketchy. In scope the book is similar to 'Malaya'; it contains a considerable amount of information well arranged in handbook form, and the author has been at pains to bring his figures up to date while the book was passing through the press.

'Into the East' (the title perhaps a little too reminiscent of Lafcadio Hearn) offers a striking contrast to the two works mentioned above. The author makes no pretensions to add to geographical or scientific knowledge, yet his book is far removed from the ordinary "chatty" book of travel which Mr. Conrad so delightfully satirizes in his introduction. Mr. Curle is seldom far from the beaten track, but he records the impressions to which he is so sensitive with such charm that he will make every resting traveller long to take the road again. He deals with those seeming unessentials which are often more illuminating than cold facts, but many of his judgments are shrewd, as, for

instance, when he remarks : "The British Empire of the East is a series of disconnected eyes all fixed on England."

Major Enriquez is concerned not so much with impressions as with facts, and very interesting facts they are, told delightfully and with humour. It is impossible not to catch something of the enthusiasm he so obviously feels for the country he serves and for the primitive people he has helped to train. 'A Burmese Arcady' is devoted chiefly to the Kachins, a tribe of the Tibeto-Burman group ; the account of how well these hill people justified the experiment of recruiting them for the Mesopotamian compaign and how cheerfully they endured the hardships of the sun-baked plains makes good reading.

Mr. Norden is a traveller of a different kind. In his 'From Golden Gate to Golden Sun' he does not profess to give anything more than a personal record and a superficial account of the countries he visits—North Borneo, Sarawak, Siam, and Sumatra. In many cases he has been compelled to cull his facts from hearsay rather than from his own observation, and he suffers occasional lapses in consequence. For example, he speaks of the North Borneo Trading Company changing its stamps every few years. The company he mentions is concerned with timber, and the Chartered Company has not changed the stamp issue since 1909. The most valuable parts of the book are the notes on the customs of the Batak, Nias, and Menangkabau Malays, but the narrative is always very readable.

'Cinnamon and Frangipanni,' an excellent title for a book on Ceylon, might easily have been made more readable had its author been content to write in a less facetious style. Mr. Gibson knows his subject and he has collected a great deal of interesting information, but the book gives the impression of having been thrown together in handfuls ; a map and an index would have improved it. The photographs however are excellent, and the chapters on the buried cities and the gems of Ceylon are especially well worth the attention of any one interested in "the isle of sweet savours." The description of the familiar moonstones as "mere frozen drops of ammoniated tincture of quinine" is particularly apt. O. R.

AFRICA.

Back to the Long Grass: My Link with Livingstone.— Dan Crawford. Pp. 378. London: Hodder & Stoughton. N.D. [1923]. *Illustrations and Sketch-maps.* 16*s. net.*

Mr. Crawford stamps his personality on every page of this book, as he has impressed it upon a considerable number of tribes in South Central Africa ; if indeed we should not give that quality of impression pre-eminently to his wife, for we are told that a certain region of the Belgian Congo is familiarly known as "the Mrs. Crawford country."

The object of Mr. Crawford is to set forth his link with David Livingstone, or rather to throw light on the closing part of Livingstone's last journey, the people he met (many of whom Mr. Crawford knew), the effect of Livingstone's example, and the results that have followed in the Luapula region. This purpose, with many digressions, he fulfils. It needs imagination and a nimble wit to keep up with Mr. Crawford ; he will, for instance, leave you in (we imagine) the year 1915 at the spot where Livingstone died, and on the next page, without a blush, without a word of explanation, write, "Now the South is calling," and proceed to describe a journey from Lake Mweru which was made, apparently, in 1896 or 1897. And the slightest thing will set him off at a tangent, while we look in vain for an index. All this disorderliness is confusing until the

reader takes Mr. Crawford on his own terms. That soon happens, for though his style is as opposed to Addisonian English as pole is to pole, it is vigorous, charged with meaning, and grips as much as did the author's 'Thinking Black.' This sequel should be read by all who wish to gain a further insight into the black man's mind.

All admirers of Livingstone, greatest of African travellers, will be grateful to Mr. Crawford for letting them see him anew and, as it were, through African eyes. There is nothing brought to light but adds to the moral stature of the man. And upon the moral and spiritual issues of Livingtone's work Mr. Crawford constantly dwells. Not that he neglects any aspect of his subject--he tells us of elephants and flies, of rivers, swamps, and the long grass, he discusses marriage customs—"marriage a mere matrimonial dance with constant change of partners"—drinking bouts, polygamy (a devastating curse, in his view, and the cause of many of Africa's woes), ethnology, and philology. On philology as the key to the mind and beliefs of the African he is insistent. Prof. Schweitzer, from his studies in the Gabun, recently assured us that within the Negro "slumbers an ethical rationalist." Mr. Crawford asserts that beyond "the halfway house spirits," there is for the African "the one and only God." This belief is "as indelible as death," yet (as elsewhere) a great doctrine, tenaciously as it may be held, seems little to affect daily conduct, and Mr. Crawford gives us a gallery full of portraits of unspeakable scoundrels—for some of whom we conceive a sneaking liking. For philology and its light upon theology see especially chapter xi., but whatever the chapter the reader is never allowed to laze. Life in Central Africa is always on a hair trigger, and those who want soothing syrup had better not read Mr. Crawford. F. R. C.

AMERICA

Alaska, the American Northland.— I. A. Gilman. London: G. Harrap. 1923. Pp. 344. *Maps and Illustrations.* 5*s. net.*

This appears to be a reading-book for United States schools designed to convey information about Alaska. It is written by a teacher of experience in the far north, and takes the form of the story describing the adventures of a party of American boys and girls "and their elders" through the heart of Alaska. The book is no doubt informative, but the characters of the story are somewhat tiresome bores. The pictures deserve praise, and there are useful sketch-maps.

The Adventures of a Tropical Tramp.— Harry L. Foster. London: John Lane. 1922. Pp. 360. *Portraits and Illustrations.* 12*s.* 6*d. net.*

In 'The Adventures of a Tropical Tramp' Mr. Harry L. Foster frankly admits the influence of his literary foreloper Harry Franck, whose 'Vagabonding down the Andes' appears to have inspired the present volume. In Peru, as elsewhere in South America, the scant European community enjoys a certain prestige, won through long years of residence and work in the country. On the strength of this Mr. Foster gained employment, was given travelling facilities, and generally made welcome. His observations of Peruvian life were hampered by an imperfect knowledge of Spanish. This does not deter him from making sweeping generalizations. Intercourse with English-speaking acquaintances, as well as Peruvians, appears however to have been cultivated chiefly in order to enable the author to indulge in caustic criticism and comparison. The assumption by our "tropical tramp" of an innate superiority to Peruvians, Peru, and all dwellers therein is hardly justified by his own candid record.

To those who have lived and worked, as well as tramped, in South America, this book and its methods violate the obligations of courtesy imposed by an open hospitality which, as Mr. Foster states, "can scarcely be duplicated outside South America." It is only fair to add that Mr. Foster's criticisms are often applied in a disarming way to himself and his rolling-stone occupations.

Mr. Foster broke no new ground. He journeyed over most of the Peruvian railroads, and was finally sent over the Government trail across the Andes, down the Amazon. His descriptions throw some light on the actual status of certain up-country settlements, marked as towns or cities on official maps, and may thus be of some value to those who contemplate similar journeyings. The book is illustrated with conventional photographs. W. S. B.

Chile To-day and To-morrow.— L. E. Elliott. New York: The MacMillan Co. 1922. Pp. 1–340.

This book contains much useful information on such subjects as the Nitrate Industry, Mining, Railway Development, Commerce, Finance, Agriculture, and the Sheep Ranches of Patagonia, and indeed may be recommended to any one who has business interests in Chile. The author has obviously taken infinite trouble in obtaining facts and statistics of all kinds. Even on these questions, however, one is apt to be disappointed by a certain cautious reserve. Has the opening of the Panama Canal, for instance, seriously affected British trade prospects in Chile or not? No answers will be found to questions of this nature. In some respects the author seems unduly influenced by the Chilean point of view. She does not apparently realize that exorbitant taxation of European commercial travellers is an almost incredibly shortsighted policy so far as the real interests of Chile are concerned. Those chapters which deal with the History, "Physical Characteristics," "Native Races and Antiquities," are quite conscientiously carried through and sufficiently well written. But there is very little that is new or of scientific interest, and, although no references are given, a large proportion of the information has already been published.

There is an interesting account of Easter Island, though it is not quite clear whether the author did or did not herself visit this unfrequented spot. The chapter on "Literature" contains the names and occasionally appreciations of some forty-three Chilean historians, novelists, dramatists, and minor poets. All students of Chilean affairs know and are grateful for the work of four or five of these writers, but we miss any allusion to the best scientific authorities, such as, *e.g.*, Dr. Reiche's 'Flora de Chile.' There are some fifty or sixty photographs; some are really beautiful, but are rather spoilt by their being placed by threes or fours on one page. No one has ever been able to explain why post offices and municipal buildings should be so frequently selected for illustration in books of this kind.

Some of the author's remarks are just a little startling. "The special causes of the general level-headedness and sobriety of the Chilean are, first, the strong position of women in family life, and next the high standard of education." In 1907, 40 per cent. of the population were illiterate; there are some three thousand schools in a population of nearly four millions occupying a country nearly 3000 miles long and 90 miles in width. Unfortunately the book has no index. G. F. S. E.

AUSTRALASIA AND PACIFIC ISLANDS

Hawaiki: the original home of the Maori.— Percy Smith, F.N.Z.Inst. Auckland, etc.: Whitcombe & Tombs, Ltd. 1921. 4th Edit. *Route Map and* 20 *Illustrations.* 12*s* 6*d.*

Ethnologists have not failed to welcome a fourth edition of the late Mr. Percy Smith's 'Hawaiki,' and to regret that its appearance was so soon followed by the close of the author's long life and indefatigable researches (noticed in the *Journal* in August 1922). The nucleus of this attractive and much-read work was first published in vols. 7 and 8 of the *Journal of the Polynesian Society;* and was largely re-written by the author before being published as a separate book. The present—fourth—edition contains much new matter from native sources, besides references and emendations not in the third. These are a palpable gain; for, as Percy Smith well knew, the revelation of Polynesian history is a matter of slow progress, claiming half the world as its venue, and its study must therefore be of a constructive order continuing as long as fresh material comes to light. Yet such is its complexity and so many are the lacunæ that misguide the explorer's probe, that it seems vain to expect a complete diagnosis of its basic truths can ever be achieved, or that any one man can reach a conclusion which will rank much above the realm of conjecture.

In 'Hawaiki' the argument is founded mainly on oral tradition, in which Polynesian lore is rich; and perhaps no man was better versed than Percy Smith in that section of the subject that he made his hobby. In so wide a study the man on the spot is as much handicapped in some ways as his opposite who labours in a great city is in others, and it is only from the concerted co-operation of workers trained in every relevant branch of research that more than partial success can result. Such a scheme, internationally constituted, has lately been launched; and among the existing assets its members must sift and consider will be the writings of Hale, Pritchard, Lesson, De Quatrefages, Fornander, and Percy Smith. B. G. C.

Two years in Southern Seas.— Charlotte Cameron, O.B.E. London: T. Fisher Unwin. 1923. *Illustrations.*

There is a patchiness and want of continuity about the text of this book which suggests that it has been hurriedly jotted down at odd moments and rushed through the press without adequate revision. The writer naïvely characterizes it as "simply a travel book"—as if travel books were all of one class and called for no exercise of intelligence or literary care in production. Perhaps the misspelling of native personal and place names is the first feature in it that strikes the eye, such as "Tahite" throughout, "Molokai" for Makogai in Fiji, and a host of others; but there are historical blunders too, of which the following example will astonish most readers, referring (at p. 275) to a "gun from the ship *La Perouse*, which was wrecked in the Santa Cruz group of islands about the end of the seventeenth century"! The writer travelled always with the mails, and stayed at hotels, where they existed and merited that term, so that much fresh or original information is obviously not to be looked for in the book. B. G. C.

Maori and Pakeha: a History of New Zealand.— A. W. Shrimpton, M.A., and Alan E. Mulgan. Auckland, etc., Melbourne, and London: Whitcombe & Tombs, Ltd. 1921. *Illustrations, Portraits, and a Sketch-map.* 9*s.*

The joint authors of this book have succeeded in compressing into barely 400 pages ($7'' \times 4\frac{1}{2}''$) what is in fact a concise history of New Zealand's affairs,

from the times of its discovery by Tasman and the systematic exploration of its coast-line by the immortal Cook, down to the outbreak of the great European war. The authors waste no words. Their volume is, in effect, a text-book suited for advanced students and (being furnished with a copious and accurate index) a useful work of reference for any class of inquiring reader, especially those residing in the Dominion itself. The law-lacking relations between Pakeha and Maori during the early years of the nineteenth century, before the Treaty of Waitangi—the age of sealers, flax-getters, whalers, and missionaries—are succinctly related in the first eighty pages; beyond that point the narrative may be characterized as an unbiassed constitutional or political history of the country during the difficult and chequered years of its evolution and latter-day maturity. Joint authorship is always a venturesome expedient; but in this instance the work has been thoroughly well apportioned and welded together, and evidently very carefully revised. Its terseness disposes one to recommend it as a reliable guide to the university student or the specialist, rather than a joy to the general reader; but the latter will find the several prospects, or summings up, of the characters and abilities of the various military and political leaders very informative and convenient for reference. A short bibliography of sources is given at the end; from which, however, one misses the good old *Sydney Gazette* and all other non-official periodicals of past times. B. G. C.

Northmost Australia: Three Centuries of Exploration, Discovery, and Adventure in and around the Cape York Peninsula, Queensland.— Robert Logan Jack, LL.D., F.R.G.S., F.G.S., M.Inst.M.M. 2 volumes. London: Simpkin, Marshall, Hamilton, Kent & Co., Ltd. N.D. [1922]. *Large 8vo. Maps and Portraits. Price £3 3s. net.*

The recent and lamented death of Dr. Logan Jack, occurring almost contemporaneously with the publication of this work, renders the critic's task a difficult and, indeed, a thankless one. The book bears evidence of an enormous amount of hard work and research, extending over many years, and there can be little doubt that Dr. Jack intended that it should be his *magnum opus*—an exhaustive treatise on the exploration of a little-known region upon whose geographical problems he had won, by the work of a lifetime, the position of the foremost living authority. And it is a poor compliment, to an author who aims high, not to judge his work by a similarly high standard. As Dr. Jack himself remarked (p. 201): ". . . I am unable to place the easy-going rule of saying nothing but pleasant things of the dead above the duty devolving on the historian to write the unvarnished truth." And it is not to be doubted that he would have been the first to admit that it is a critic's duty also.

The book, as its sub-title explains, is planned as an historical account of geographical exploration in the Cape York peninsula, from the period of its first discovery to the present day. This end, in a sense, it certainly achieves—that is to say, it gives a vast amount of detailed information relating to the work of the various explorers, arranged in chronological order. But the details given (many of them quite irrelevant) have been allowed to usurp altogether too prominent a place. There is a painful lack of balance—of historical perspective. There is neither foreground nor background, and in many parts, especially in the second volume, one is tempted to pronounce that the work is not so much a history as the materials for one, primarily designed for consultation, and not for perusal.

Moreover, in the midst of an enormous amount of detail which the ordinary

reader has no means of verifying, and must therefore take upon trust, it is somewhat disquieting to find that some curious slips have been made in connection with matters either of common knowledge, or at least capable of easy verification. Take, for example, the following passage (p. 82): "Beyond question, Lieutenant-Commander (by courtesy Captain) James Cook, R.N., ranks foremost among the navigators who helped to build up the British Empire." It would not be easy to convey a more incorrect impression of Cook's naval status. In the first place, the rank of Lieutenant-Commander (not Lieutenant *and* Commander, a now obsolete courtesy title) was unknown in the Navy until 1914. And secondly, while Cook was successively promoted to Lieutenant in 1768, Commander in 1771, and Captain in 1773, not one of these was a courtesy title, all of them being substantive ranks granted in the ordinary course of promotion.

Again, on the following page we read, *à propos* of the *Endeavour's* complement: ". . . Among the latter [the civilians] were Mr. (afterwards Sir) Joseph Banks, a naturalist with a leaning towards botany, who had been President of the Royal Society. . . ." As Banks was, at this date (1768) twenty-four, the unique character of his previous tenure of Newton's chair would seem to call for some slight remark. Actually, he did not become President until ten years later.

The superabundance of detail is curiously emphasized, on almost every page, by a trick of breaking, apparently almost at random, into capital letters for the purpose of stressing some detail or phrase. The following is a typical specimen: "All at once, without any warning, a SPEAR came from behind and STUCK deeply in the off flank of the MARE on which I was riding . . ." (p. 543). Again, Dr. Jack, when detailing his own explorations, gives, apparently for the sake of completeness, copies of all his reports to his superiors, and also annotated and expanded versions of them: so that one frequently finds within a few pages two descriptions, on much the same scale, of the same events. This may be of value to later historians, but it does not make for readability or sustained interest.

In a work planned on such an elaborate scale, and containing such a mass of detailed description, it is to the maps that one naturally would turn for assistance in grasping the course of the explorations described. Unfortunately, with the best will in the world it is impossible to say much in their favour. Printed in black outline, without either tint, shading, or contours, it is very hard at first sight to distinguish sea from land, or to determine whether any particular line represents a river, a coast-line, a reef, or an explorer's track. In a work of this price the reader has a right to expect something better.

With all its faults, however, the book is still a valuable one for the student, who will find it both stimulatiag and encyclopædic. Had it been ruthlessly pruned in the matter of superfluous detail, and provided with maps worthy of the name, it would have made an equal appeal to the general reader.

R. T. G.

POLAR REGIONS

The Northward Course of Empire.— **V. Stefansson.** London: G. G. Harrap & Co. 1922. Pp. 274. *Illustrations and Map.* *7s. 6d. net.*

The old conception of the Arctic dies hard: men succumbed to exposure, sickened of scurvy, and perished of cold. The dread of the winter and the darkness have been dispelled only slowly, for the sufferings of many expeditions of the latter half of the nineteenth century gave the public their only conception of life under polar conditions. Mr. Stefansson has tried hard to

dispel these ideas. He was not by any means the first to show that Arctic life does not necessarily entail hardship. John Rae, seventy years ago, Nansen at a later date, and several others have proved that human life can be sustained with relative ease on the produce of sea and land. Mr. Stefansson would go further than this. He sees in Arctic lands, at least those not heavily glaciated, great potentialities for settlement and food production. In the domestication of the musk-ox, which he suggests would be more popular under the name of ovibos, and the breeding of reindeer, he shows how the prairies of the Arctic mainland and islands of Canada might well be utilized; in fact, must be utilized as the pressure on the world's food resources becomes greater. To make use of these lands in this or next generation would seem to be merely a matter of anticipating the inevitable necessity that will arise. Mr. Stefansson has a good case, and he states it with persuasive force. But it is difficult to attack and defeat the old myths of the hardship and starvation of the Arctic: the belief in the inevitableness of scurvy died but slowly, and perhaps is not altogether extinct. Nothing has delayed the exploitation of Spitsbergen coal more than false conclusions based on the latitude of the land, and such misconceptions linger most in the minds of those who pride themselves on their "practical" outlook and "sound" judgment. But Mr. Stefansson is most persistent in his mission: he knows the difficulties he has to face in overcoming prejudice, and yet is not despondent of winning the public of Canada to his point of view. His book merits close attention.

R. N. R. B.

MATHEMATICAL AND PHYSICAL GEOGRAPHY

Plane and Geodetic Surveying.— David Clark, B.Sc. London: Constable & Co. 1923. 25*s. net.*

This treatise is one of the Glasgow textbooks edited by Prof. G. Muncur. It consists of two volumes of 400 and 300 pages respectively.

The first volume is devoted entirely to plane surveying; the second, in the words of the author, to "such parts of geodetic work as are of interest to the civil engineer." Both are well bound, clearly printed, include ample enough illustration by plate and diagram, and are written in clear and pleasant style. At the end of each chapter indexes give a fairly full and very useful summary of standard works. As regards the matter itself, there is little to find with which one may quarrel, although here and there opinions may differ.

It is however a treatise with a very limited outlook. In his introduction the author states, "In a general textbook on surveying there is little room for originality, except in treatment," and little originality has been shown. The aim, in fact, seems to have been to meet the requirements of a surveyor whose work is limited to very small areas. This point is well illustrated by the fact that the references to triangulation in the first volume if put together would hardly fill a page, in spite of the fact that triangulation from a small base would in many cases prove a more economical, as well as more accurate, solution than any other in providing the control. The chapter on traverse hardly mentions the value of such intersections and resections as the surveyor would normally employ to amplify and to strengthen his work. In the same way, plane-tabling is treated in volume 1 almost entirely from the point of view of a graphic record of instrumental surveying.

In volume 2 one is confronted with a doubt as to whether the author really means to include geodetic matter which is of interest to the ordinary engineering surveyor, or whether he is trying to confine himself to what is of value to him. If it is a question of interest, then some reference might be made to our own

national achievements and those of other nations. A sketch of the development of geodesy and its bearing on other sciences would surely not be out of place. In his opening paragraph on geodesy the author gives a list of very interesting points. Supposing we take from that list such subjects as his No. 3, "The Mean Density of the Earth," or his No. 9, "Vertical Movements of the Crust," and look further through the chapter for more information, we shall find none. These points are obviously not of great practical value to the ordinary civil engineer, but then neither is a discussion of the Ordnance Survey and Canadian geodetic theodolites. If, on the other hand, the author is endeavouring to stick to value, why are no geodetic tables given, nor any guide as to the triangulations which may be met with in the world at large? Again, on page 84 of volume **2** reference is made to a certain formula as given by Colonel Clarke, in the account of the grand triangulation of England, for the determination of latitude and longitude, given geodetic azimuths and sides. This is the formula which was used for the solution for the longest possible lines; and because of its precision, and therefore necessary elaboration, it is not suitable for sides shall we say of less than 50 miles. Clarke's formula as given in his Geodesy (pp. 45 and 272), which is of considerable interest to surveyors, and which was used, for example, in the geodetic survey of South Africa, both for the calculation of latitude and longitude and for rectangular co-ordinates, is not mentioned. Throughout the whole treatise, in fact, there is a lack of definiteness which makes it difficult to extract matter of immediate value or to get at a helpful comparison of the precision, the utility, and the expense of the various methods described. If, as the author mentions, there is no room for originality in a general treatise, there is, at all events, room for a really comprehensive book on surveying which, without perhaps the cumbrous style and redundancy of Jordan's 'Vermessungskunde,' should yet be a work to which a surveyor could turn with confidence on all matters, plane and geodetic, affecting his vocation. H. S. L. W.

The Evolution of Climate. — **C. E. P. Brooks, M.Sc., F.R.A.I., F.R.Met.Soc.** With a Preface by G. C. Simpson, D.Sc., F.R.S. London: Benn Bros., Ltd. 1922. Size 9 × 6, pp. 173. *Price* 8*s.* 6*d. net.*

When we consider the immense literature that has grown up round the subject of palæoclimatology, and the number of conflicting theories and hypotheses that have been evolved in this connection, we must feel that the author has emerged from all this perplexity with a masterly picture of climatic history. He presents his point of view with an assurance that must command respect even though in places we may feel that it would have been safer to say that events probably occurred than to imply that they actually did take place. He is careful, too, to meet the objections of critics who have very rightly pointed out the uncertainties attaching to the interpretation of past climate on palæontological evidence, and in this respect the student should feel on comparatively safe ground under Mr. Brooks' guidance.

His cardinal doctrine that purely terrestrial or geographical conditions sufficed to bring about the Quaternary Ice Age and neighbouring phases of climate has more than once been noticed in this *Journal* (vols. **54**, p. 63, and **59**, p. 218), and we may allow that elevation and subsidence of land areas, coupled with alterations in the distribution of land and sea, have been a potent factor in the genesis of those slow vicissitudes in temperature, rainfall, and wind distribution which no one now seriously doubts have marked the course of the geological ages. The warm and equable early Tertiary epoch is thus explained by a configuration permitting a far more vigorous streaming of warm

water into the Arctic Ocean than at present, and it may be that this source of warmth can account for the almost sub-tropical floras of Greenland and other northern regions at that time. But it is a somewhat bold assumption that a dark ocean-borne Arctic warmth is necessarily equivalent to the direct sun-produced warmth of lower latitudes. We feel, too, that the author has missed the potential value of Wegener's theory of continental drift for interpreting climatic changes upon biological evidence. He allows that Wegener cannot be dismissed with a gesture, and though he shows why the theory will not account for the Pleistocene glaciation, he admits that the case is substantially different in regard to the Permo-Carboniferous glaciation, whose record is now left in tropical latitudes. But he fails to bring out the importance which a theory such as Wegener's would have, if substantiated, in permitting us to attribute a temperature-change experienced by a piece of wandering land to a latitude-change in the amount of direct solar radiation received. Throughout his generally excellent book we notice a neglect, not merely tacit but expressed, of light and radiation in the author's climatological reckonings. Thus in a footnote on p. 16 he says that by the term radiation "we shall in future understand only that part of it which is responsible for thermal effects," thus neglecting the enormous importance in the economy of living organisms of the direct action of radiant energy in all parts of the solar spectrum. Quite recently it has been shown experimentally in the United States ('Annual Report of the Smithsonian Institution,' 1920), that many of the seasonal functions of plants are governed more decisively by the duration and intensity of daylight than by the temperature of the air. And this is in accord with general experience. The renewed life of spring is due more to the alleviation of the darkness of winter than to any commensurate relaxation of the cold and similarly in autumn the accumulated warmth cannot make up for the radiant warmth of summer, either biologically or in some of the physical processes of the atmosphere.

There is much in nineteen none too long chapters, deciphering the fragmentary climatic record of the Ages in all parts of the globe, that will stimulate the geographer, geologist, the meteorologist, the biologist and the anthropologist, and the discussion is brought down to the present epoch. The book is unmistakably written in support of the author's own theory, but this is fully excused in the appreciative preface by Dr. Simpson. L. C. W. B.

HISTORICAL GEOGRAPHY

The Great Capitals: an Historical Geography.— Vaughan Cornish, D.Sc. London: Methuen & Co. 1923. Pp. xii. and 296.

This admirable piece of historical geography from the pen of Dr. Cornish may be commended to the notice of those who, as is too often the case nowadays, profess to deal with the subject while possessing no geographical qualifications, whatever may be their competence as historians.

To call it the best bit of work in historical geography that has been published for years would mean little, as almost nothing worthy of the name has been published—at least, as professedly historical geography; and it is true to say that the book is really in a class by itself, at once the only and the standard work of its kind. All its merits may be traced to the fundamental fact that it is essentially geographical; indeed, it shows throughout every chapter the three characteristics of the real geographer—a mass of accurate knowledge, wide outlook, and searching inlook. And its impartiality is so marked that one would scarcely guess its author's special interest in strategic geography.

Q

The book is essentially an intensive study of location, based on a threefold classification of natural regions as concerned mainly with (1) productive areas, in which storehouses are likely to be found; (2) areas of easy movements in which there must be some important junctions; and (3) areas difficult of approach, in which special spots may be magnificent natural fortresses. Neither ease nor difficulty of access is of much importance unless, and until, there is some good reason for developing or obstructing traffic; and therefore the importance of junctions and fortresses is closely dependent on, and subordinate to, that of natural storehouses.

For this reason a national capital tends to be in or near such a storehouse; but this tendency has always been modified by the interaction of other factors, such as other national areas, involving foreign affairs. So the capital of a "mature" state is in "a forward position" with respect to the most important neighbour—for the time being. The ideal capital, then, is the most important junction on that side of the chief storehouse of the particular nation which faces the most critical frontier.

This is not only a new theory, but in direct opposition to many of the prevalent ideas as to the position of a capital; and it may be said at once that Dr. Cornish has gone far to establish his point in a long and detailed analysis of a great number of the world's famous capitals in all historic ages. Wherever, and whenever, we find such geographical conditions, the same historic process follows. As the Chinese expanded eastward in the earliest days, the capital moved eastwards also—to Kaifeng; when danger threatened from the west, it moved westwards—to Sian, at the other end of the natural storehouse and thoroughfare of the Wei valley. There was a similar oscillation between Patna and Delhi, at opposite ends of the storehouse and thoroughfare of the Ganges valley. So France was conquered from the north-east, and the capital moved steadily southwestwards—from Tournai to Tours, and then back to Aix—till the Saxon frontier was made safe.[1]

In every case Dr. Cornish applies the same method, based on his belief that "geography is specially concerned with favoured districts, history with decisive epochs"; and we get the same stimulus as from Dr. Hogarth's 'Ancient East,' with a little more emphasis on the geographical factors. That is to say, Dr. Cornish makes a general analysis of the influence—what is, to him, the more or less permanent influence—of conspicuous and typical features and phenomena. He ignores the inconspicuous and the untypical, and stresses the human factor, surveying the whole interaction of the man and the place—far beyond the ordinary interpretation of the word "locality." And he is careful to look all round the phenomena—to examine how man has both modified, and been modified by, the place, *e.g.* by the conversion of mainland into island in Holland, or by the introduction of irrigation into the Punjab.

In spite of the immense accumulation of details, the book is never dull. The wide knowledge and the scrupulous accuracy are presented in such a way that one feels only their suggestiveness, not their weight. Indeed, the suggestiveness is one of the great features of the book, seen in trivial as well as in vital details, *e.g.* the relation of lava to road-making (p. 64); of the northern frontier of ancient capitals to wine-growing (p. 87); of the importance to Constantinople of the Roman habit of road-making and bridge-building, and of the Greek habit and aptitude for the sea (p. 93); of the Arian heresy to the differences between the Burgundian and Visigoth peoples and their Teutonic rulers (p. 109); of the relative merit of the early Teutons and Slavs as fighters to the fact that the former had been neighbours of Rome, and learnt military art from the greatest of all teachers of that art.

A single—abridged—quotation taken from this last context will give a typical example of the whole atmosphere of the book. "The map which most clearly reveals the close physical connection of Frankfurt with the Hessian part of Rhenish Franconia is that which emphasises the 500-foot contour. . . . This shows a long straight depression continuing the line of the rift-valley in a slightly east-by-north direction to a point nearly east of Giessen, prolonged to Cassel by a slighter depression following the same direction. . . . The line of communication thus included in the metropolitan part of the mediæval Germany was historically connected with the Franks' ford."

The defects of the book are few and—with one exception—trivial. There are a few infelicities of expression, *e.g.* (p. 77) "an average temperature of 48·9° F. *throughout the year*," which is not, literally, the same as a mean annual temperature of 48·9° F.; it is a pity to call the Khingan scarp "mountains"; it is useless to take statistics, *e.g.* of harbour depths (p. 121), from a book published thirty years ago; and some of the American matter scarcely deserved a place in such a book.

But the only real defect is the absence of an introductory chapter. There is, certainly, an illuminating but very tiny preface; and this might have been enough if the book had at once taken us into familiar scenes, *e.g.* to Bible or Classical lands. But we are swept off to east-central Asia, an area about which many of us know very little; we are not certain of the spelling, still less of the location, of many of the place-names; we scarcely realize the immense differences of geographical control—on plant and beast and man—between our own and a monsoon or steppe environment; and we cannot see the Oriental truly and clearly in his strange environment. A longish introductory chapter explaining all these essential differences of control and response, with the parallel contrasts between east and west, would have been of great service; and we would then have entered on the historical geography of Mongolia with interest and understanding.

L. W. L.

GENERAL

An Annotated Bibliography of Sir Richard Burton, K.C.M.G.— Norman M. Penzer. Preface by **F. Grenfell Baker.** London: A. M. Philpot, Ltd. 1923. *Portrait and Facsimiles. Price* £3 3*s.*

The appearance of Mr. Penzer's book, shortly after the centenary of the birth of Sir Richard Burton, affords us a welcome opportunity of estimating the latter's real position in the Temple of Fame, once a subject of much controversy. Lovett Cameron writes that "most of the stories that have been circulated to his detriment have arisen from his way of telling anecdotes about himself, and putting his own share in the transaction in the blackest possible light." He certainly did not suffer fools gladly, and, like most pioneers, had good cause to resent ignorance and lack of sympathy at headquarters. Various lives of Burton have appeared, which do not possess enduring value, and it is only due to Mr. Penzer to say that now, for the first time, we are able to realize fully the splendid services rendered to the cause of civilization and the British Empire by Burton. Indeed, it is with a feeling of awe that we read the full tale of the achievements of his strenuous life, to which no single review can hope to render adequate justice.

Burton was a great explorer. His journey to Harrar, then entirely unknown, to which he penetrated at the hourly risk of his life, was a brilliant achievement. It is vividly described in his absorbing book on the subject, which proved the geographical and political importance of the task he so successfully accom-

plished. His greatest achievement was the penetration of the Dark Continent and the discovery of Lake Tanganyika, followed by that of Victoria Nyanza by his companion Speke. These and other discoveries made Burton the greatest pioneer explorer in East Africa. They were carried out in the face of difficulties that inoculation and other resources of to-day have immensely lessened. The financial question too was almost always a source of anxiety to him.

To take another side of his character, his knowledge of man was almost uncanny. He was perhaps the first who studied anthropology as a science; he was also able to disguise himself with complete success. His journey to the sacred cities of Mecca and Medina prove his extraordinary powers in this direction, backed as they were by an amazing knowledge of Oriental languages and literature. Nor was he an Orientalist only, for his translation of Camoëns was yet another feat, carried out with true poetical feeling.

Burton was a great scholar. He always dug down to bed-rock, and was thereby enabled to throw a flood of light on the mentality and the customs of the people he wrote about. His best known work is a translation of the 'Arabian Nights,' in which obscure points and customs are illuminated with profound knowledge, but he wrote many other works on different subjects. To sum up, Burton was a great explorer, a great scholar, and a poet, besides possessing an amazing amount of information on almost every subject. Thanks to Doctor Baker and Mr. Penzer, a Burton Memorial Fund has been raised under the auspices of the Royal Asiatic Society, and his memory will be kept green by the triennial award of a medal to a pioneer in those lands—and they are many—that interested Richard Burton, whose right to rank among the greatest men of his day is now fully established. P. M. S.

The Racial History of Man.— **Roland B. Dixon.** New York and London: Chas. Scribner's Sons. 1923. 25*s.*

Prof. Roland Dixon has essayed a very formidable task in writing a racial history of man, but as a book on this subject is much needed he is to be thanked for his courage and industry.

Prof. Dixon has divested himself as far as possible of preconceived opinions, and has very wisely paid little heed to the conclusions of previous students in order to make a fresh start in racial anthropology. He takes nothing for granted and follows his evidence fearlessly to whatever conclusions it may lead him. The result is a book that, while it corroborates certain conclusions arrived at by others, is packed with new ideas and generalizations. These doubtless for a long time will provoke criticism, but, whatever may be the final result, anthropologists will in the mean time have to reconsider their premises as well as their interpretations of the racial history of man—which is all to the good. The study of anthropology has been overcrowded with observations, measurements, and ratios, many of which do not appear to have much value, and they form too cumbersome an equipment for taxonomic purposes. In order to correlate fossil with recent human remains, osteological characters alone can be used; of these the skull is the most important, and of the numerous skull characters Prof. Dixon has selected three of recognized value, the cranial index, the height index, and the nasal index. It is customary to divide indices into three groups, of which the middle is intermediate between the other two. By combinations of the outer groups of the three indices, eight fundamental "types" are established by Prof. Dixon, and nineteen "blends." The author deals solely with the former, regarding the latter as due to mixture. This method causes certain varieties to be classed together, which in some cases appears disconcerting, and will certainly lead to discussion.

He correctly observes that as "we have as yet no absolute standard of race, against which we may measure peoples to determine their true racial character and affiliations, we can only set up arbitrary standards, and, using these as our measure, determine the character and relationships of people *in terms of our arbitrarily selected units*" (p. 8). To these units he does not apply the term "race." He gives names to these eight types, most of which are already in use; but he employs them solely according to his definition, and therefore they do not necessarily correspond in all respects with the older terms. The introduction of the term "Caspian" for what have been in the main termed "Proto-Nordics" is a happy innovation, as it to some extent replaces the unsatisfactory term of "Caucasian." Another feature of his scheme is that he ignores pigmentation and the nature of the hair in the definitions of his types. "Thus the Proto-Negroid type [to take one example] designates a form of skull which is Dolichocephalic, Hypsicephalic, and Platyrrhine, and carries with it no necessary implication whatever that any other features which we may be accustomed to think of as occurring in Negro crania are also present; and the statement that among a given people the Proto-Negroid type is strongly represented does not imply that they have or had a black skin or woolly hair" (p. 23). Prof. Dixon describes his study as an "experiment," and further discussion will show how far he is justified in dealing with his selected characters in the way he has done, and in passing by other characters and intermediate forms. Accepting the premises, we must allow that the racial history of the main areas of the world and of various peoples and small areas is treated in a logical manner. Certain usually accepted hypotheses are substantiated, but new and at first sight somewhat startling views are propounded. The author is to be congratulated upon having broken away from the teaching of American anthropologists in admitting the considerable racial complexity of North and South America.

Without wishing to be captious we may point out that Prof. Dixon has not provided students with sufficient data to form their own conclusions readily; for example, we are informed that Alpine, Ural, Palæo-Alpine, and Mongoloid types have had their share in the formation of the inhabitants of Valais, but no mention of Valais, as such, is made in the account of Swiss racial history; thus it is only by looking through some half-dozen authorities who are referred to, that the student can find the exact information he may desire. As this is characteristic of the book, it means that everything must be taken on trust, unless the student has access to a very extensive library and has the time to find out which books contain the desired information.

The book is provided with a number of maps of percentage distribution of various types, numerous portraits of varied peoples, and a useful bibliography. It is clearly and pleasantly written, it is passively provocative without being contentious, and incidentally it displays the great erudition and transparent honesty of the author. A. C. H.

The Oldest Letters in the World tell us—what?— Mrs. Sidney Bristowe. London: George Allen. 1923. 8vo. Pp. 86. *Price* 5*s. net.*

The argument of this essay is rather historical than geographical. It is an attempt to interpret the well-known Tell-el-Amarna correspondence between Egyptian kings of the later eighteenth dynasty and their own officers, or contemporary sovereigns, in western Asia, in the light of the hypotheses that the 'Haberi of these letters are the Biblical Hebrews; that the reason why Amenhotep IV. omitted to support his Syrian subordinates was that his religious

sympathies were with these monotheistic invaders of his dominions; that the Phœnicians of later times were descendants of these Israelites, as was believed, for example, by Pomponius Mela and Camden; and so forth: an ingenious mosaic of statements collected from first-hand and second-hand writers, without much appreciation of their relative values. J. L. M.

The Face of the Earth as seen from the Air.— W. T. Lee. American Geographical Society, Special Publication No. 4. New York. 1922. Pp. 110. *Maps and Illustrations.*

The chief value of this book lies in the collection of air photographs which it presents. They have been well chosen and admirably reproduced. In the main they have been selected to illustrate three uses of aeroplane photography: the presentation by it of new views of familiar subjects, the opportunity offered by it of a study of land-forms from a new point of view, and its value for mapping. Map and photograph of the same landscape placed side by side are instructive in showing the appearance that particular features assume from a high altitude. Some of the pictures of land-forms showing considerable relief are very striking. The author makes no exaggerated claims for the value of the aeroplane in survey work. For coastal charts air photographs may be of value in locating shoals or rocks, but much depends on the surface state of the water. Under certain conditions submerged objects are visible at considerable depths, while at other times they are almost invisible. The aeroplane may be useful in indicating new shoals on a surveyed coast or estuary, but it cannot replace detailed sounding. Most of the photographs reproduced were taken by the Air Services of the United States. R. N. R. B.

Shackleton's Last Voyage.— Commander Frank Wild, C.B.E. Cassell & Co., Ltd. Pp. xvi., 372. 30*s. net.*

One of the charms of Polar narratives has always been the unconscious revelation of the explorer's personality and character. This was particularly the case in Shackleton's own books, and now Commander Wild, in describing his leader's last venture and tragic death, has insensibly set the stamp of his own simple and fearless character on his account of the voyage of the *Quest*. Like its author it is straightforward and to the point. The Antarctic part of the book is contained in three long chapters, wherein he describes adventures in the ice, oceanographical surveys in the little-known Enderby Quadrant, and a voyage from the neighbourhood of Coats Land across the Weddell Sea to Elephant Island. More would certainly have been done, new land perhaps discovered, but almost from the day she left Plymouth the *Quest* suffered from engine trouble. Six valuable weeks were lost from this cause at Lisbon and Rio de Janeiro, and as a consequence Commander Wild had at his disposal little more than one month of the short summer season during which Antarctic discoveries are possible. Though not achieving success, he did everything to deserve it, and now wins his readers' sympathy by his careful concealment of the bitterness which he must have felt at having to turn back just when soundings showed that he was coming very near new land.

After the Antarctic cruise the *Quest* refitted at South Georgia, and proceeded to carry out the programme of visiting the little-known South Atlantic islands. Gough Island was visited and surveyed, and Mount Rowett, the highest point of the island, ascended for the first time by Mr. Douglas. Tristan da Cunha was the next objective. Commander Wild has much to say about this lonely outpost, and the life and peculiarities of its inhabitants are exhaustively

described. The abundance of new material from these two islands shows how much remains to be done even in sub-Antarctic latitudes.

In his preface Commander Wild states that he has intentionally limited his narrative to the more popular story of the expedition. This plan, admirable at first sight, appears almost to have been carried too far, for on reaching the appendices the reader suddenly finds much new and valuable information, and discovers at last maps and charts, which might well have appeared in the narrative proper, and which incidentally are not entered on the list of illustrations. The contributions of Captain Worsley and his fellow-workers make very interesting reading, and this is especially true of Dr. Macklin's essay on polar ailments and the prevention of scurvy. J. M. W.

Die Kartenwissenschaft.— Max Eckert. Ester Band. Berlin and Leipzig: Walter de Gruyter & Co. 1921. 4to, pp. 640.

This valuable and comprehensive treatise on Cartography is an important addition to the works which deal with the mathematical side of geography. It was the author's intention to supplement it by an atlas in which reproductions of maps illustrating stages in development would appear, but at present this is not practicable.

The first division of the work deals with theoretical cartography, and sets out the principles underlying it and the aims which are borne in mind among the many competing claimants for attention.

Map projection is not treated mathematically, but the principal systems are described and the history of their development and use is recounted. The relative suitability of various projections for different purposes is discussed at some length, and instances of their use are given. After these studies of the groundwork of cartography we pass on to the preparation of the material provided by the topographer according to the purpose that the map is intended to serve, whether for economic, scientific, or statistical purposes, and the scale on which it should be drawn. This necessitates a short consideration of various surveying processes, and of the effectiveness of the control of geographical features which is provided by them.

The material having been examined and prepared for the cartographer's use there arises the question, In what form should it be expressed on the map? Scale, orientation, place-names, conventional signs, etc., come up for consideration at this stage. This aspect is very fully discussed and is a useful addition to the literature of the subject.

The remainder of the work treats in much detail of the representation of relief in cartography. The various attempts, more or less successful, are traced from early times through the later efforts of the eighteenth century, when the first serious attempts were made to solve the problem.

The various systems used in the nineteenth century, when the question was to a large extent solved, are described and discussed, so that in these 100 pages we have a masterly exposition of this fascinating subject. To the historical account is added an even fuller technical discussion of all the various methods, hachuring, contouring, lighting, colour schemes, etc., which will be of the greatest value to all who are occupied with cartographical work.

A detailed examination of this quarto volume of 640 pages, amply provided with notes and references, would take more space than it is possible to give here, but though opinions may differ on some of the views expressed and the deductions which are drawn in its pages, none will dispute the fact that we have in it a masterly treatise on the subject of cartography.

H. G. L.

THE MONTHLY RECORD

EUROPE

Orientation in Holland in Early Days.

IN a short but interesting article in the *Tijdschrift* of the Netherlands Geographical Society for March 1923, Dr. J. W. Muller calls attention to a somewhat remarkable tendency, which manifests itself alike in early Dutch literature and in the system of place-names, to a use of the cardinal points of the compass in a sense deviating very considerably from the true directions, and always (which is the striking point) in the same sense. It is not merely, for instance, that north is used for any direction a point or two off the true north, which would be intelligible enough, but that the divergence is nearly always counter-clockwise, and commonly amounts to as much as half a right angle, north being used for north-west, east for north-east, and so on. This is illustrated in the poem of Constantine Huygens on his "Hofwijck," or country house, and even in the narrative of the English traveller, Fynes Moryson. "Western," again, is used to distinguish French from Rhine wine, or the language of southern (or south-western) from that of northern Holland. Places are very commonly distinguished by the prefixes "west" and "east," much more rarely by "north" and "south," and this helps us to a clue to the reason for the tendency in question. It can be explained by the trend of the coast-line of the "North" sea, which (correctly so named in relation to the Frisian home of the early Dutch seafarers, but losing its strict application as it bends round to the south) served as a general basis of reference for the definition of direction, especially in the maritime parts of the country. This is borne out by the fact that the tendency spoken of becomes much less marked in the interior.

The Population of Italy in 1871 and 1921.

The recent census of Italy, taken in 1921, supplies the material for an instructive comparison of the present population of Italy with that which it supported fifty years ago, at the time of the unification of the kingdom. This has been supplied by General Pompilio Schiarini in the *Bollettino* of the Italian Geographical Society, Num. 9–10, 1922. The official returns give the figures for 1921 as regards both the population actually present at the date of the census and that considered as resident or legal, the criterion being a statement by the head of the household that any members absent from Italy were expected to return before the end of 1922. Within its pre-war limits the figures were respectively 37,276,738 and 38,522,694,* the number of temporary emigrants to foreign countries being thus well over a million. In 1911 the population was 34,671,377, the proportional increase within the decade thus amounting to 7·51 per cent., a proportion exceeded (in Europe) only in the Netherlands, Denmark, Norway, and Bulgaria, and distinctly satisfactory in view of the many causes—earthquakes and volcanic eruptions, floods, war, and epidemics—which have taken their toll of human life. In the half-century since the unification the proportional increase has been 40 per cent., whilst in less than a century it has about doubled. The writer tabulates the figures for five of the last censuses by the sixteen "regions" into which the kingdom is divided, showing the proportional increase in each during the half-century.

* Including the new provinces, the totals were respectively 38,835,941 and 40,123,006.

It comes out highest in Latium (the only one in which the population has more than doubled, and this is mainly due to the growth of Rome), Apulia, Sicily, Liguria, Venezia, and Lombardy, in all of which it has exceeded the general mean. In one region only—Basilicata—has there been an actual decrease. In another set of tables the changes in the half-century are given for the separate provinces and their chief towns, and of the former five, viz. Milan, Syracuse, Rome, Lecce, and Catania show an increase more than double the mean for the whole kingdom. The increasing tendency to aggregation in cities is shown by the high percentage of increase (83 per cent.) arrived at by taking all the provincial chief towns together. In 1871 one city only, Naples, exceeded the half-million, but now Milan and Rome have also far passed that limit. Five cities, Catania, Syracuse, Grosseto, Rome, and Milan, show an increase of over 167 per cent., or more than double the average. The general facts brought out bear witness both to the vitality of the Italian race and to the advance made during the half-century in improving the conditions of life.

The Port of Cherbourg.

The growing importance of Cherbourg as a transatlantic port is shown in a short note by R. Hainneville in *Annales de Géographie*, July 1923. This development dates from 1867, when the Royal Mail Steam Packet Co. set the example of employing it as a European terminus of the transatlantic navigation. At the present time most Western European lines to America make it a port of call. In situation, accessibility, and facilities for the rapid handling of traffic, it is claimed as superior to most Channel ports. The most recent development has been the erection by the R. M. S. P. Co., the White Star, and Cunard Lines of "infected quarters" and hotels for the control of the stream of emigrants from Central and Eastern Europe, where they are medically examined, cleansed, and housed prior to their departure for America. Further extensions to ensure more comfort and speed in the passenger traffic, already large, are also in course of completion. In 1921, 75,000 passengers used the port; in 1922, 105,000.

The Fluctuations of the Neusiedlersee.

The remarkable fluctuations to which the Neusiedlersee (formerly altogether in Hungary but now transferred for the most part to Austria) is subject have long called for remark, and a good deal has been written about them, some having supposed that they must be accounted for by underground drainage. Our knowledge of the phenomena is summed up in *Petermanns Mitteilungen* for December 1922 by Dr. Halbfass, who endeavours to sift out duly established facts from mere hearsay statements. An idea once held that the lake first originated in the Middle Ages has been proved false by the discovery on the lake-shore in 1874 of stone implements contemporaneous with the pile-dwellings of neolithic age in the Neuenburg lake. But there is no doubt that the lake has been subject to great vicissitudes, and it is believed to have almost dried up at various dates from the thirteenth century on. In 1868 it was possible to travel dry-shod along its whole axis from south to north, though this does not mean that no water remained at certain spots elsewhere. So low a level does not seem to have been reached since. Various attempts to drain the lake entirely, so as to utilize its bed for permanent cultivation, have been made since 1780, and between 1873 and 1895 a serious effort in this direction was made in the digging of the Einser canal, intended to carry off the water into the Raab and by it into the Danube. The result has certainly been to lessen the fluctuations and generally to reduce the water-level, but it has proved impossible to

drain the lake entirely in this way, since the fall is so slight that even at high water the amount of water removed is not great, and at low water some finds its way back in the reverse direction. Dr. Halbfass has examined all the rainfall records available for the lake basin, and finds that the rainfall fluctuations that can be made out by no means coincide with the fluctuations of the lake. The reason is that the level of the water depends much more on the extent of evaporation, which in turn depends on the temperature, and is anyhow likely to be high on account of the strong atmospheric circulation due to the lake's position on the borderland between the mountains and the plain. A single hot summer may wipe out the water-supply received in a whole year or even in several years. In any case there seems no reason to fall back upon the notion of drainage by underground channels functioning intermittently.

ASIA

Scientific Results of the De Filippi Expedition of 1913–14.

We are glad to call attention to the plans which have lately been announced for the publication of the scientific results of the De Filippi expedition to the Karakoram and Central Asia in 1913–14, the general outlines of which are well known to readers of the *Geographical Journal* (see especially vol. 46, pp. 85 *et seq.*). Few expeditions have brought back so valuable a harvest of observations in the most varied branches of geography and geophysics, and it is matter for congratulation that these will now be made available to students in a form worthy of their importance. Thirteen volumes of quarto size are contemplated, divided into two series. The first of these, concerned with Geodesy and Geophysics, will contain three volumes, devoted respectively to geodetic astronomy, gravity and magnetism, and meteorology. All the studies under these heads will be contributed by the members of the expedition responsible for the respective observations. The second series, of ten volumes, is under the general editorship of Dr. Giotto Dainelli, and will embody the geological and geographical results in a collection of monographs written by specialists in the separate subjects. It is the editor's aim to supply in this way a complete summary of existing knowledge of the region in question in respect of the subjects dealt with. One volume, by Dr. G. Caraci, will give a general account of the expedition and its work, and others will treat of the rocks and geographical formations, the fossils, the glacial conditions, ethnology, and natural history. Of these, volume 3, dealing very fully with the glaciology, has already appeared, and it is hoped to review it adequately in an early number of the *Journal*. The format is quarto, and the paper and print leave nothing to be desired, while in this volume, as in the whole series generally, the illustration by means of views, panoramas, and maps of all kinds is carried out in the most lavish and attractive style. The price for the whole series (which is produced by the firm of Nicola Zanichelli of Bologna) is fixed at 2500 lire. To subscribers paying in advance for the whole the volumes will be sent carriage paid, but to those paying for each volume on its appearance an extra charge of 10 per cent. will be made to cover carriage. The undertaking is a great one, and if successfully carried through the work is likely to rank among the most important of its kind yet brought out.

AMERICA

New Names on the International Boundary between Canada and Alaska.

We are indebted to the Secretary of State for Foreign Affairs for the information, communicated by H.M. Chargé d'Affairs at Washington, that at its

meeting on 4 April 1923 the United States Geographic Board paid to Great Britain the compliment of assigning the names of eminent British subjects to a glacier and certain peaks lying along the boundary, as shown in the following list:

Lamplugh Glacier: on southern side of Reid Inlet, Glacier Bay, between Johns Hopkins and Reid Glaciers, Alaska. After G. W. Lamplugh, English geologist, who visited Glacier Bay in 1884.

Mount Armour: peak (altitude 8776 feet), lat. 59° 54′ 15″, long. 138° 42′ 22″. International Boundary, Alaska and Canada. After John D. Armour, Judge, Supreme Court of Canada, and one of the original Canadian members of the Alaska Boundary Tribunal in 1903.

Mount Bagot: peak (altitude 7148 feet), lat. 59° 20′ 41″, long. 135° 1′ 46″. International Boundary, Alaska and Canada. After Sir Charles Bagot, British Ambassador to Russia and a plenipotentiary at St. Petersburg in 1882 in negotiations regarding the Alaskan boundary.

Mount Canning: peak (altitude 6927 feet), lat. 59° 14′ 50″, long. 134° 41′ 59″. International Boundary, Alaska and Canada. After the Right Hon. George Canning, British Secretary of State for Foreign Affairs, 1822, who carried on British negotiations with Russia regarding the Alaskan boundary.

Mount Herbert: peak (altitude 6090 feet), lat. 59° 45′ 59″, long. 138° 37′ 30″. International Boundary, Alaska and Canada. After the Right Hon. Sir Michael H. Herbert, British Ambassador to the United States during the early sessions of the Alaskan Boundary Tribunal, who joined in framing and signing the treaty by which the tribunal was created.

Mount Ogilvie: peak (altitude 7700 feet), lat. 58° 51′ 34″, long. 134° 15′ 25″. International Boundary, Alaska and Canada. After William Ogilvie, who made field surveys from 1893 to 1895 and aided in making the maps upon the basis of which the present international boundary was determined.

Industrial Centres of the Pacific Coast.

One has lately heard much of the possibility of the substitution of the Pacific for the Atlantic as the great commercial highway. In this connection may be noted an article in the Autumn 1922 number of the *Geographical Teacher* by H. M. Spink, under the above title, written to demonstrate the possibility of the growth on the American Pacific coast of industrial centres which may seriously compete with those of the Eastern States. The article is based, not upon arguments drawn from the possible decline of the eastern areas, but upon the opportunities for development presented in the Western States, especially Washington and California.* As regards climate, it is contended that the invigorating and equable conditions of the Pacific seaboard are responsible for a 20 per cent. increase in the efficiency of its workers. The climate is also favourable for timber, agriculture, and especially for fruit-growing and intensive nursery gardening, now largely in the hands of the Japanese, while the fisheries are well developed; but it is obviously not upon this basis that a great economic system can be erected. There are, however, considerable coal deposits in British Columbia and Washington, as well as the anthracite fields of Alaska, at present being opened up. Abundant supplies of petroleum are forthcoming in southern California, and hopes are entertained of further supplies from Alaska. Apart from the precious metals, and the tin of Alaska, the writer gives little indication of the potentialities of the mineral

* It is worth noting that the special industrial advantages possessed by the *Eastern* States are dwelt upon by H. M. Strong in the *Journal of Geography* for December, 1922, pp. 348–351.

resources. Finally, the innumerable mountain streams present extensive opportunities for the provision of hydro-electric power; it has been calculated that in California, Oregon, and Washington there is to be found 42 per cent. of the maximum water-power available in the United States. The writer then discusses more fully the situation and trade of the two leading districts, San Francisco and Seattle-Tacoma. In both cases the recent prosperity has been largely due to the war. On a consideration of their prospects, the writer concludes that Seattle will probably become the economic centre of the region; it is nearer to China, Japan, and Alaska, and more accessible from the Eastern States. As to the future the author seems somewhat optimistic.

Though the Pacific coast has developed rapidly in recent years, the permanence of the factors responsible for this growth should be examined carefully. The whole question resolves itself into a matter of the relative position and condition of the post-war world markets. Already American trade with the Far East, Australasia, and South America has shown a proportionately greater decline from the level reached in 1919–20 than has her trade with the rest of the world. The trade of the Pacific Coast with the Far East, as the author recognizes, must depend to a considerable extent upon the political relations between the two countries, which are liable to be disturbed by the immigration question. In this trade the Panama Canal plays a part not entirely advantageous to the Pacific States, since, though it allows their products to compete in the markets of the Eastern States, it also permits the latter to compete in the trade with the Far East. While Europe remains America's biggest customer, it is unlikely that the economic supersession of the Eastern by the Western States will be accomplished.

The Ports of Peru.

We have been favoured by the Peruvian Consulate in London with a summary statement of the present position in regard to trade of the various ports of Peru, scattered along its 1500 miles of coast to the number of some forty, though three-fourths of these are only minor ports. As is well known, the Peruvian ports are confronted with a serious drawback in the form of the violent ocean swell, which shakes pier and sea-wall to their foundations and compels ships to stand out and load and unload by means of lighters. Between June and November the only ports where commerce can be carried on to any extent are Callao, Chimbote, Paita, Samanca, and Independencia, which enjoy a natural protection from the swell. In 1920 the total tonnage entering and clearing all the ports was a little over and a little under 8 millions respectively. Of this amount Great Britain was represented by 2,707,304 tons, the United States by 1,362,640 tons, and France by 148,938 tons. Callao, as serving the most populous region and the ocean terminus of the central railway, naturally takes the largest share of the total, handling two-thirds of the country's total imports and two-fifths of its exports. Salaverry has lately taken second place, largely owing to the war-time demand for sugar. Chimbote's commerce is at present small, but it has undoubted advantages in its protected position and its mineral hinterland. Mollendo, though at present showing a very considerable tonnage, may have to give place, by reason of its exposure, to the superior advantages of a neighbouring bay. Pimental and Eten are rivals, their fortunes in the past having been largely determined by railways. Since the opening of the railway at Pimental in 1915 it has begun to forge ahead. Pisco, halfway between Callao and Mollendo, has a large traffic in sheep, skins, vicuña, sugar, and precious metals, but it has no protection from the swell, and all work has

to be suspended when the *paracas* or southern breeze blows. Of the minor ports, Samanco shares Chimbote's distinction of being one of the best harbours on the western coast, while Independencia Bay, reputed to be the finest bay along the whole Pacific coast, will one day make use of its great natural advantages, although the region around is uncultivated.

Irrigation in North-Eastern Brazil.

The *Bulletin of the Pan-American Union* for January 1923 contains a useful summary, by J. W. McConnell, of the position in north-eastern Brazil in regard to irrigation undertakings, in which a marked step in advance has lately been taken by the authorities. The popular idea of tropical Brazil as a region of rich vegetation and plentiful rainfall is quite incorrect as regards most of the area north of the Amazon. This has been seriously handicapped in the past by the often-recurring droughts, which play havoc with the agricultural and pastoral industries. It is a thinly populated region, and its resources and drawbacks are little known to the outside world. From the standpoint of personal comfort the climate of this arid region is excellent. With a low humidity and a steady breeze from the Atlantic, it is much more endurable than the summer climate of southern Arizona or California, the shade temperature rarely rising above 92° F., whilst the nights are delightfully cool. The country is intersected by streams, which join to make several large rivers, the valleys of which are wide and fertile. But the rainfall is almost entirely confined to one part of the year—normally from December to April or May—and during the dry season the trees become bare, the grass brown, and the ground is baked hard under the tropical sun. And this is not all, for unfortunately the rains cannot be depended on ; and when, as happens more or less periodically, they fail altogether, the result is disastrous. One of the worst droughts was that of 1877-79, lasting thirty months, in which the state of Ceara alone lost 300,000 of its citizens and 75 per cent. of its herds, the results of thirty-two years' growth and prosperity being virtually swept away. Hence the absolute need for storing the water-resources for use in such emergencies, and as in the drought years the streams run nearly dry, the reservoirs must be able every five or six years to furnish a large part of the total supply without replenishment, and in great droughts may be the only source of supply for thirty months together. The creation in 1909 of the Inspectoria de Obras contra as Seccas was an important step in advance, and this has since been followed by the passing of a law authorizing the construction of a system of great reservoirs to feed selected irrigation systems, and the preliminary creation of a network of railways and highways indispensable to the rapid prosecution of the work, as well as generally beneficial to the industrial life of the region. A map which accompanies the paper shows both this system of communications and the sites of the proposed reservoirs, some thirty in number, for which the relief of the country offers considerable advantages. Contracts have been entered into with British and American engineering firms for the execution of the works.

AUSTRALASIA AND PACIFIC ISLANDS

Geelvink Bay, New Guinea.

The recent survey of this bay on the north coast of West New Guinea by the Dutch Department of Marine gives occasion for a note by C. Craandijk in the March number of the *Tijdschrift* of the Netherlands Geographical Society, in which attention is called to the survey of the bay carried out by Jacob Weyland in the *Geelvink* in 1705, the excellence of which for its time is well brought out by a sketch of the resulting chart given side by side with one of

the new survey of 1923. The writer also calls attention to the fact (already pointed out by Leupe in 1875, but not perhaps generally known) that the name Geelvink was given in 1705, not to the large bay to which it is now universally applied, but to a small indentation a little to the west of the great bay, which latter was merely called "De Groote Imbocht." Dalrymple, who knew Weyland's chart, also merely calls it "The Great Bay." Mr. Craandijk says that it would have been better to apply the name "Geelvink gulf" to the large expanse, reserving "Geelvink bay" for that originally so called. But it is not to be expected that a name so well established could now be altered.

MATHEMATICAL AND PHYSICAL GEOGRAPHY

Anchor Ice.

The Russian physicist, W. J. Altberg, of the Central Physical Observatory, Petrograd, contributes to the *Quarterly Journal of the Royal Meteorological Society* (January 1923), a discussion on "frazil," "ground," or "anchor" ice, which in certain conditions forms at the bottom of rivers and on submerged objects. The theory of Barnes, according to which the bottom of the river is cooled by radiation below the temperature of the water, is declared to be untenable, inasmuch as measurements by various physicists of the coefficient of absorption by water of radiation of different wave-lengths indicate that there is no wave-length in the infra-red for which water has not a high coefficient of absorption, and that 1 cm. thickness of water would suffice to intercept all appreciable radiation from a black body at the freezing-point of water. Altberg has conducted very careful and exhaustive observations and experiments both in rivers and in the laboratory, which have left him in no doubt as to the real explanation of anchor ice. He had been offered special facilities for research in consequence of a very unusual and serious case, in December 1914, of freezing of the Neva. The bed of the river, at a depth of 20 metres, was covered with a continuous sheet of loose ice 0·76 metre thick, which by enveloping and blocking the apertures of the receiving pipes interrupted the water-supply of Petrograd. He concludes, from a careful study of the distribution of temperature in rivers, and from laboratory experiments in which the phenomenon was produced under conditions absolutely precluding the possibility of any such radiation effect as Barnes postulates, or the introduction of ice to the bottom from the surface of the water (which according to Aitken's view may effect ground freezing), that anchor ice in rivers is a phenomenon due to the joint effect of super-cooling and mixing. Water is commonly in a *slightly* super-cooled condition, and if the current in a stream is such that the heat generated by incipient congelation is carried away by mixing at a suitable rate from the bottom to the surface layers the formation of ground ice may proceed unhindered. Or, put in the author's own words: "The mechanical intermixture of the layers thus maintains an energetic interchange of heat between the bottom and the surface, and affords the means for a *continuous* super-cooling, and therefore for an uninterrupted process of crystallization. In this circumstance lies the whole root of the matter."

GENERAL

The Royal Asiatic Society's Centenary.

The centenary celebration of the Royal Asiatic Society opened on July 17 with an interesting address by the President, Lord Chalmers, who eulogized the splendid work done by his predecessors, making special mention of the epoch-making discoveries of Sir Henry Rawlinson. H.R.H. the Prince of Wales, who closed the proceedings in a thoughtful speech, pointed out the

great importance of officials studying the peoples among whom they lived, and stated that he had been much impressed, during his journeys round the world, by the manner in which the torch of Oriental learning was being kept brightly burning. Addresses were presented by thirty-six societies, Sir Francis Younghusband representing the Royal Geographical Society. Important papers were read at the meetings, at which many distinguished delegates took part. Some of them were received by H.M. the King, and degrees were conferred at Oxford, among those thus honoured being the President, to whose untiring efforts and urbanity the meeting largely owes its success.

P. M. S.

Geography at Edinburgh University.

Mr. Alan G. Ogilvie has been appointed Lecturer in Geography in the University of Edinburgh in succession to Mr. G. G. Chisholm, who had held that position since the Lectureship was founded in 1908. The value of Mr. Chisholm's services is well known, and we hope that, while enjoying the well-earned leisure afforded him by his retirement, he may long continue to give geography the benefit of his wide knowledge and experience.

OBITUARY

Sir Henry Howorth.

By the death of Sir Henry Howorth, on July 15, at the age of 81, a most interesting personality has passed off the stage. Howorth had a very wide intellectual range, politics, archæology, geology, and history being his chief subjects. He was for many years a Fellow of this Society, and frequently spoke at the meetings. He wrote many books, chief among them being his 'History of the Mongols' and 'The Mammoth and the Flood.' But it was mainly through his enthusiasm for learning and for progress that he made his influence felt, and many young men were stimulated by his encouragement and by a visit to his richly stored library and his numerous treasures of art.

In spite of his age, he retained his keen interest in life to the very end, and had for some time been engaged on a new edition of his monumental work on the Mongols. His death will be keenly felt by his many friends. Owing to the growth of specialism, men with such a wide range of interests are becoming increasingly rare, and their loss is the more to be regretted. P. M. S.

CORRESPONDENCE

The Journal of Father Samuel Fritz.

The June number of the *Geographical Journal* contains a review of the Journal of Father Samuel Fritz's travels translated by Dr. George Edmundson from the Evora MS. and published by the Hakluyt Society in 1922.

In the course of this review it is remarked that Dr. Edmundson has found "a unique MS. of mission history," and that "the writer's identity is unknown." Dr. Edmundson, who calls the MS. "the long-lost Journal" of Father Fritz, is responsible for both these opinions.

With reference to these statements I take the liberty of submitting the following:

1. The Evora MS. has been known for some considerable time, and will be found described in Sommervogel's 'Bibliothèque de la Compagnie de Jésus,' tome III. (Bruxelles–Paris, 1892), col. 1003 *in voce* Fritz, Samuel.

2. The Evora MS. is not *unique*, nor even first hand. It is a copy of a

part of a more extensive MS. entitled "Noticias auténticas del famoso río Marañon y Misión apóstolica de la Compañía de Jesús de la provincia de Quito en los dilatados bosques de dicho río. Escribíalas por los años de 1738 un misionero de la misma Compañia." The MS. of 324 quarto leaves is in the library of the "Real Academia de la Historia" of Madrid.

3. The whole of this Madrid MS. has been published by Marcos Jimenez de la Espada and is to be found in *Boletin de la Sociedad Geográfica de Madrid*, Part xxvi. (1889)–Part xxxiii. (1892). The part corresponding to the Evora MS. is in Pt. xxx. (1891), pp. 193–235; 381–405; Pt. xxxi. (1891), pp. 22–48.

4. The writer's identity is *not unknown:* it is Father Paul Maroni, S.J. This identity, first a highly probable conjecture by M. J. de la Espada (cf. *Boletin de la Sociedad Geográfica de Madrid*, Pt. xxvi. (1889), pp. 194–202), has been definitely established by F. Eugenius Uriarte, S.J., in 'Catalogo Razonado de Obras Anónimas y Seudónimas de Autores de la Compañía de Jesús pertenecientes à la Antigua Asistencia Española' (Madrid, 1904), I. p. 473, No. 1341.

C. WESSELS, S.J.

St. Willibrord College, Katwijk a/Rijn (Holland),
22 July 1923

The Banda Arc.

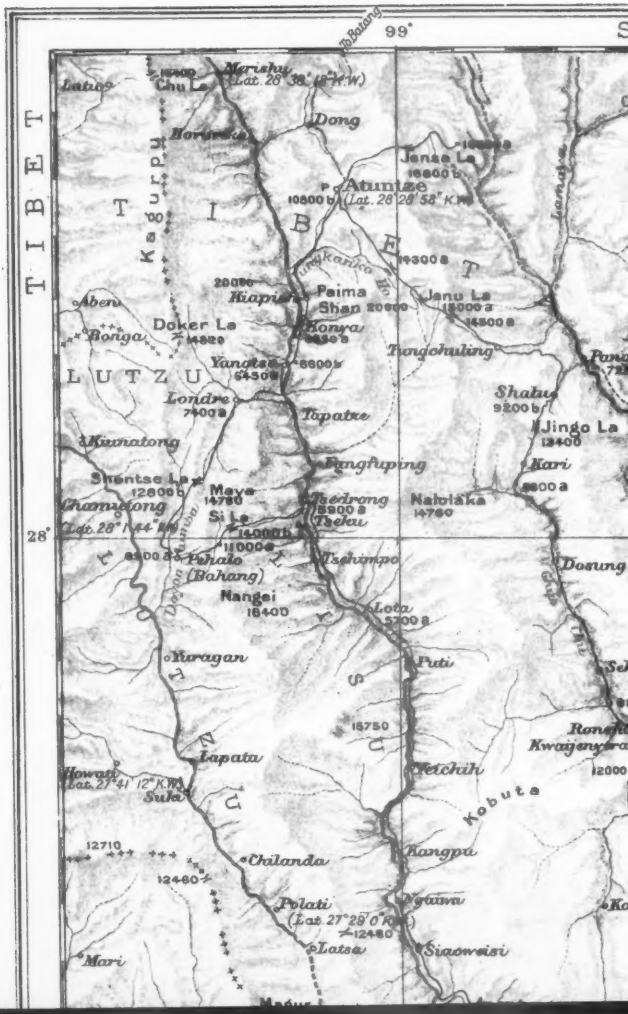
In the very interesting paper by Prof. Gregory on "The Banda Arc" (*Geogr. Journ.*, July 1923, pp. 20–32), Mr. R. L. Cox remarks (Discussion, p. 30) that a small collection of fossil molluscs made by the Danish Expedition to the Aru Islands, which according to Prof. Gregory have until recently always been represented as consisting of quite recent coral limestone, disproves that theory, and that these fossils indicate rather "a late Miocene or early Pliocene age of some deposits on the Aru Islands."

I beg to add that Miocene deposits from the Aru Islands have been known since 1910. In Mr. H. Merton's book on the Kei and Aru Islands (*Forschungsreise in den südöstlichen Molukken* (*Aru- und Kei-Inseln*), Frankfurt a/M., 1910) I gave (pp. 206–207) a short description of some of his rocks, and I found in microscopical slices of a limestone from Terangan (one of the Aru Islands) small specimens of *lepidocyclina* (with rotalia, Caculogypsina, and Amphistegina). The age of this limestone proved thus by these lepidocyclinæ to be Miocene, and probably Upper Miocene.

The Hague, July 1923. R. D. M. VERBEEK.

Note by Prof. Gregory:

As Dr. Verbeek's note on the rocks of the Aru Islands was published in 1910 in an appendix to a work on a 'Zoologischen Forschungsreise,' and there was no reference to it on the title-page, I had not come across it until after reading the paper on the Banda Arc, which dealt mainly with the Kei Islands. The note has also been overlooked by the Admiralty Pilot, and by the author in Holland to whose work I trusted for incorporation of all geological work on the area between Dr. Verbeek's paper of 1908 and 1914. The paper by Miss Currie, Mr. L. R. Cox, and myself on the Aru Islands, which will be published shortly, contains full reference to Dr. Verbeek's account of the Aru Island rocks. His identification of some of the deposits there as Upper Miocene, and the apparent absence of anything earlier, supports the conclusion of my paper on the Banda Arc, and that reached by the examination of Prof. Jensen's collection from the Aru Islands. I am much obliged to Dr. Verbeek for calling attention to the fact that he had already discovered pre-Pleistocene Upper Kainozoic rocks in the Aru Islands.


99°
TIBET
Ka Urpu
Latuo
Chu La
Merishu
(Lat. 28° 38' 15" N.W)
Dong
Horwaka
Jense La
Atuntze
(Lat. 28° 28' 58" K.W)
Tungkanica
Paima
Shan
Kiapie
Aben
Doker La
Konya
Tangchuling
Yanatse
Londre
Tapatze
Shatuo
Jingo La
13400
Kunatong
Panghuping
Kari
Shentse La
12800
Maya
14780
Chamotong
Si Le
(Lat. 28° 14' K.W)
Tsedrong
Taekau
Naiolaka
14760
28°
Tsechimpo
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Nangei
16400
Lota
5700
Yuragan
Puti
15750
Lapata
Howath
(Lat. 27° 41' 12" K.W)
Suka
Tetchih
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Chilanda
Kangpa
12460
Polati
(Lat. 27° 29' 0" K.W)
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Siaoweisi
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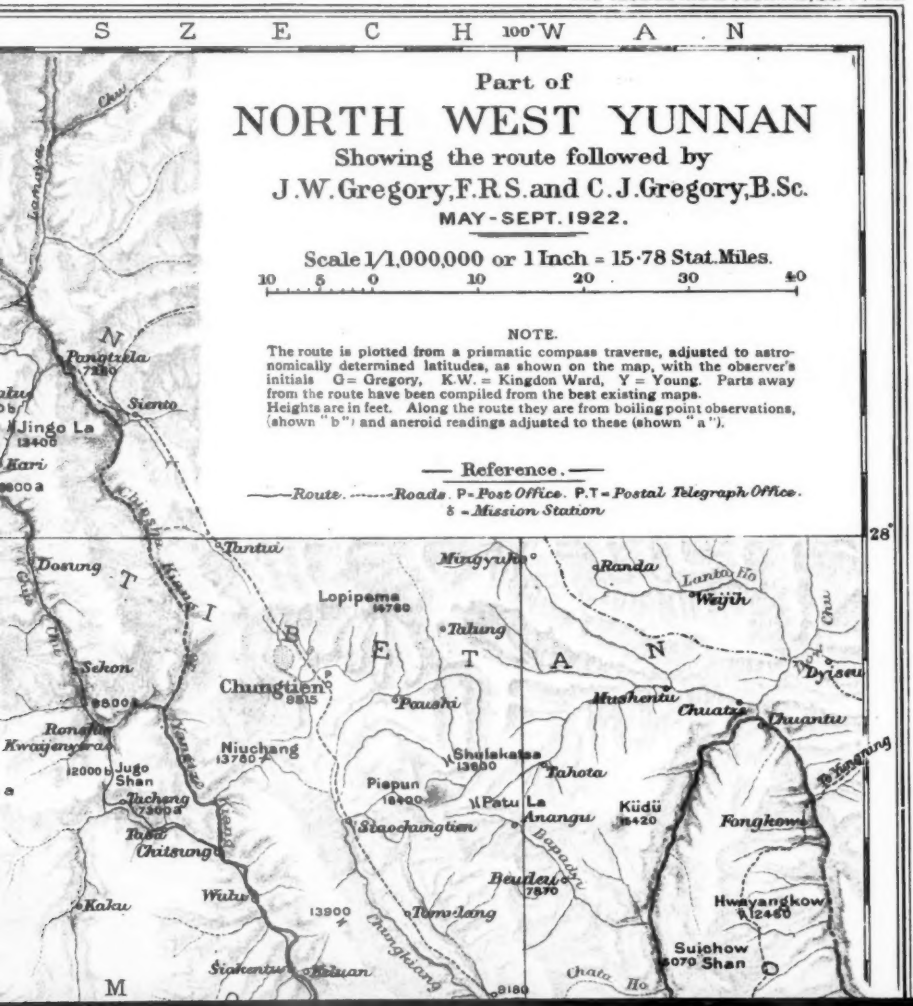
S Z E C H W A N
100° W
Part of
NORTH WEST YUNNAN
Showing the route followed by
J. W. Gregory, F.R.S. and C. J. Gregory, B.Sc.
MAY-SEPT. 1922.
Scale 1/1,000,000 or 1 Inch = 15·78 Stat. Miles.
10 5 0 10 20 30 40
NOTE.
The route is plotted from a prismatic compass traverse, adjusted to astronomically determined latitudes, as shown on the map, with the observer's initials G = Gregory, K.W. = Kingdon Ward, Y = Young. Parts away from the route have been compiled from the best existing maps. Heights are in feet. Along the route they are from boiling point observations, (shown "b") and aneroid readings adjusted to these (shown "a").
Reference.
Route. Roads. P = Post Office. P.T = Postal Telegraph Office.
S = Mission Station
28°
Pongtsila 7280
Siento
Jingo La 13400
Kari
Tantui
Dosung
Lopipema 14780
Mingyuhe
Randa
Lanta Ho
Weijih
Tahung
Sekon
Chungtien 9815
Paushi
Mushenu
Chuatze
Chuantu
Dyisee
Kwayengrai
Niuchang 13780
Shulakasa 13600
Tahota
Jugo Shan 12000 b
Piepun 13400
Patu La
Anangu
Küdü 11420
Fongkow
Tacheng 7300 a
Taka
Chitsung
Staochungtien
Bapadzi
Beudeu 7870
Kaku
Wubu
13900
Tsmolang
Hwayangkow 12460
Suichow 5070 Shan
Siakentze
Chata Ho
9180
M
O

BURMA
LIUKIANG
LIUSUMMIT
LIUSHIH
LIUNIN
LIULOLO
Chilanda
Tangpa
Chaisung
Pulati
Lat. 27°29'0"N
12480
Yangwa
Kalau
Wulu
Mari
Latsa
Siaoweisi
Magur Chi
Anantu
Shatyama
Lawtadi
Hokatang
Oshia
8200 b
Shiku Wachi
Laowa
Weisi
7200 b
Litien
8500 a
Lutipin
11100 a
Chungtu
Omati
Tochi
12480
13270
Chingkoutang
10170
27°
Siapia
Siaotien
Mukwatso
Shapo P.
Waita
Lakhe P.
13590
Yusutsa
Lipata
Tila
Tsechenka
Tatuchi
13475
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Chuchilo
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Darangacha Bam
Namsaihpu Bam
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Lamati
Tieho
Shaiyiping
14800
Tashiaaze
Putsen
Maghai
Shiteng
12500
Sajyang P.
Lanchigti
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Koutsehai
Yelu Shan
Lachima
Tangweitang
Lipu
Fumoto
12300
14000
Yingpankai
(Lakatsing)
7800 a
Lanping
Ladowati
Changaw Pk
13600
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Lakouti
Yakowan
Hpawte Bum
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Paokuti
Shwantanchang
Lat. 26°16'58"N
Chimili
Tuwan
Hpawahik Bum
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Chang
Lotsolo
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6200 a
6700 a
Pehyunchang
Lat. 26°9'
Szetingkai
Maochai
Lat. 25°5'8"
12615
Piaotsai
Chientsow
Lat. 26°4'20"N
6300 a
7400 a
26°
Himmaw
Luchang
11135
Tungten
Tengking
11805
Maotsaoping
Laowu
Shuichang
Shihmentsing
5500 a
Laku
Lat. 25°50'4"N
Laha
Lat. 25°50'22"N
8500 a
Kwanping
5200 a
Lagwi P.
10480
Pongka
Yunlung
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Feihung
Lat. 25°47'20"N
Shachow
Hukukow
Kui Po
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Sihung
Tachai
Waichow
Chungchai
Tsaokaien
Luchang
6350 a
7000 a
Kanhaitze
Mayinkai
Kaokiao
14440
Changlau
Changtang
Kwanchiao
Lichipa
Shasungsha
Kaitou
Howan
5000
Yung
Makutang
Chengm
Kutung
Sate
5300
Watien
Tongyen
Shweli R.
Salween R.
Lu Kiang or Salween R.
Mekong R.
Lancang Kiang or Mekong R.
Yangtze R.
Nmkwang Kiang
Mekh Rung
Laking Kawng
Ngawchang Hka
Chashan Ho
Lung Kiang
Lung Ho

Hwayangkow
12460
Suichow
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Chata Ho
Chata Shan
13700
Fuku
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Mouying
Lukuji
Mantow Shan
Dyinaloko
Satasto
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Nguluhsu
27°
Kotsinyo
Yant Shan
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Lotus Shan
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Muchutai
Asha
Paisha
LIKIANG
18000 a
Shihkai
Semiapa
Tsilikiang
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To Lungpeh
Kwanyilang
Kwansia
7700 a
Tungtien
14100
Lauchung Shan
Chiuho
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Feagmingkai
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Shensendyi
Yenaping
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Maitzechow
Hoking
Yelu Shan
Machiping
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Kuenchwan
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Khrhaisowa
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Pakochai
Timotsun
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Chungping
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Chetsatze
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To Kungpeh
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Kinohowtsing
Langkiung
Hwangkiaping
Chungse
26°
Tushao
Tengchwan
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Fengyii
Kiangpan
Shangkwan
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Pingyi
Kwanping
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Wasi
Mayao
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Kiantowtsun
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Yungping
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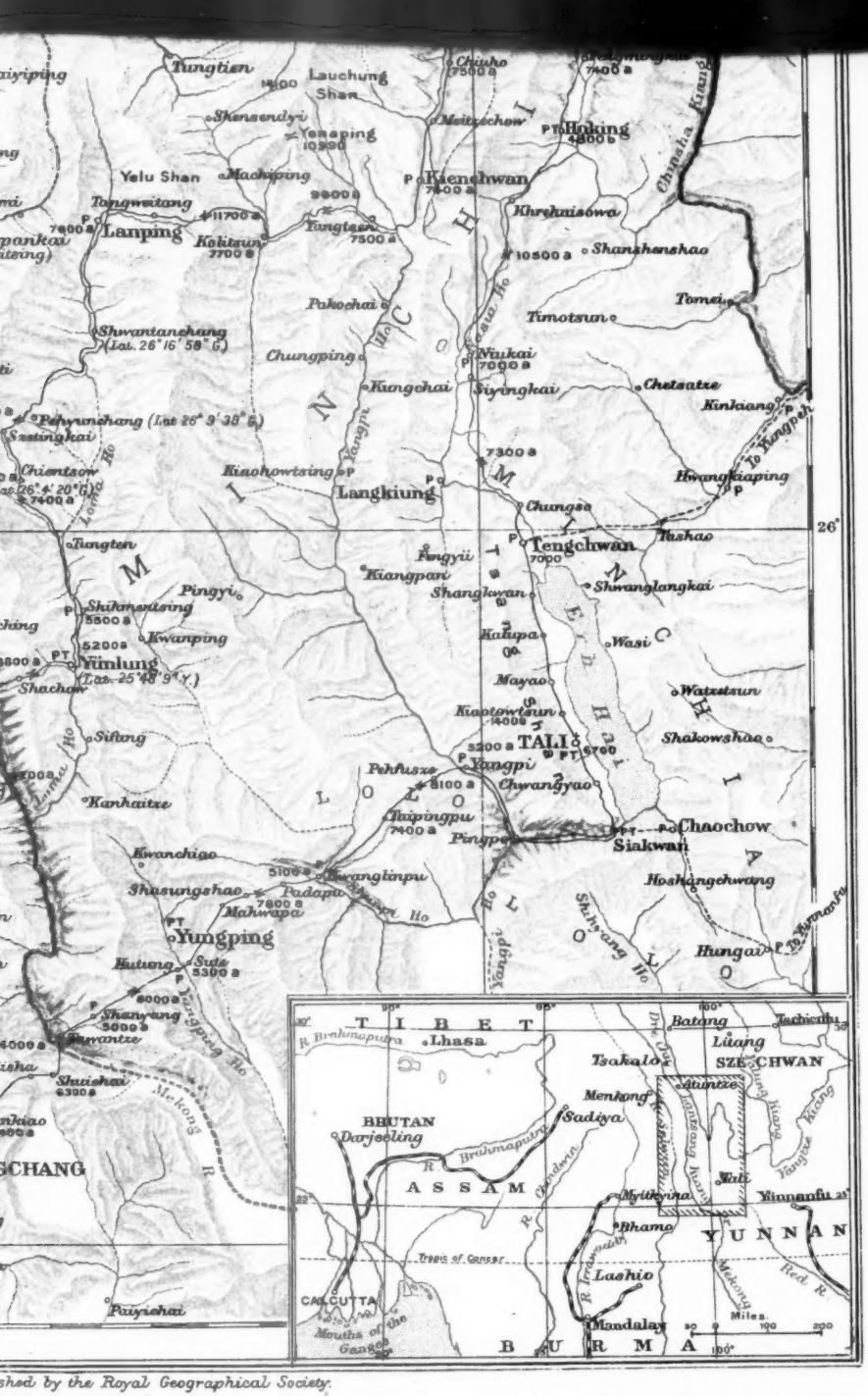
Hungai
To Yunnanfu

Published by



shed by the Royal Geographical Society.

NORTH WEST YUNNAN
Gregory.